October 1986

Canada $4.95 U.S. $3.95

Just for your Tandy Color Computer 1, 2 and 3

The RAINBOW®

THE COLOR COMPUTER MONTHLY MAGAZINE

Hi-Res Halloween

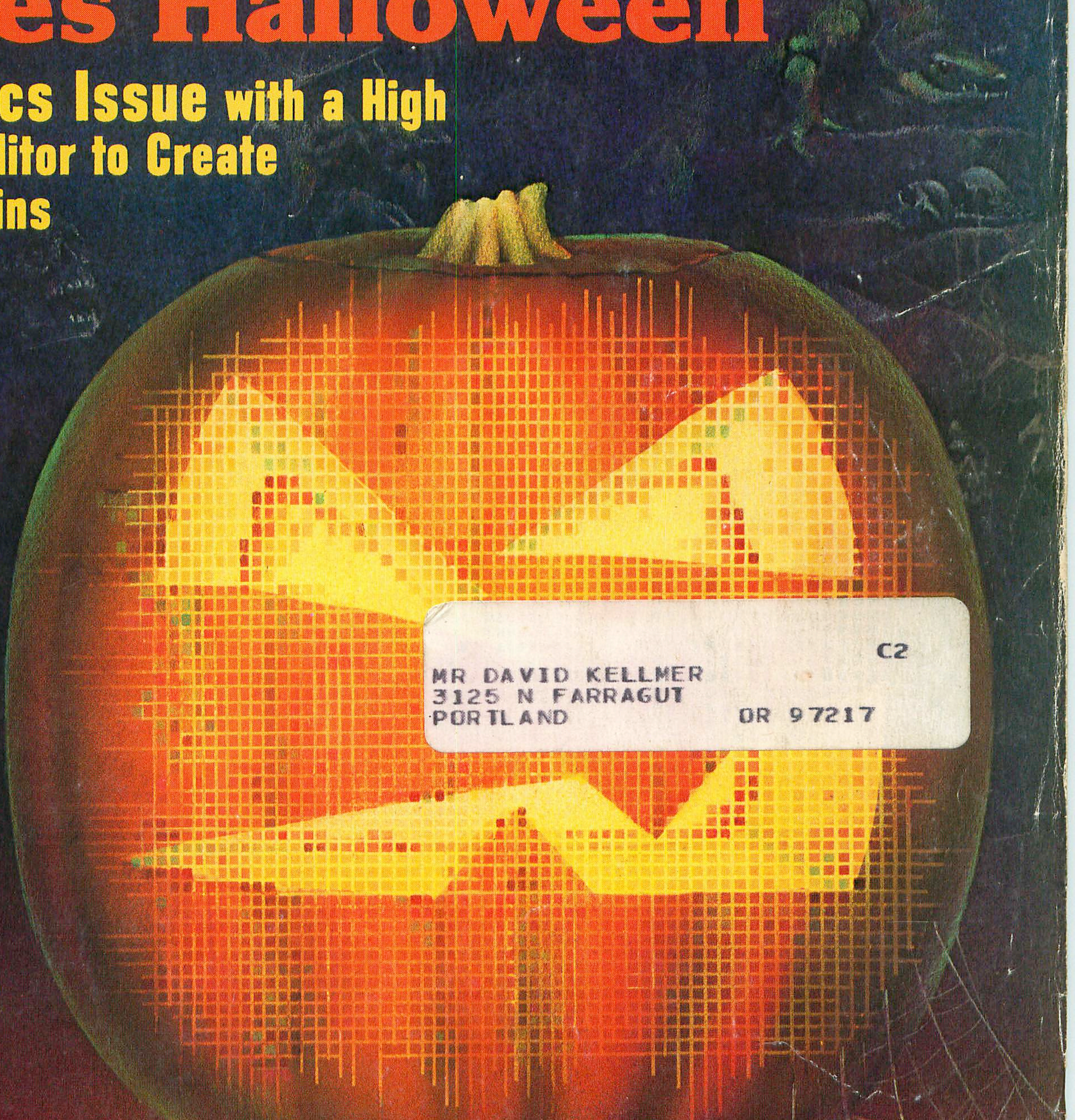
Our Graphics Issue with a High Resolution Editor to Create Ghosts, Goblins and Ghouls

Along with utilities to:

stretch them,
reduce them,
enlarge them,
detail them,
optimize them,
and change their
extensions!

And:

From Rick Adams and Dale Lear, two programs just for the new CoCo 3



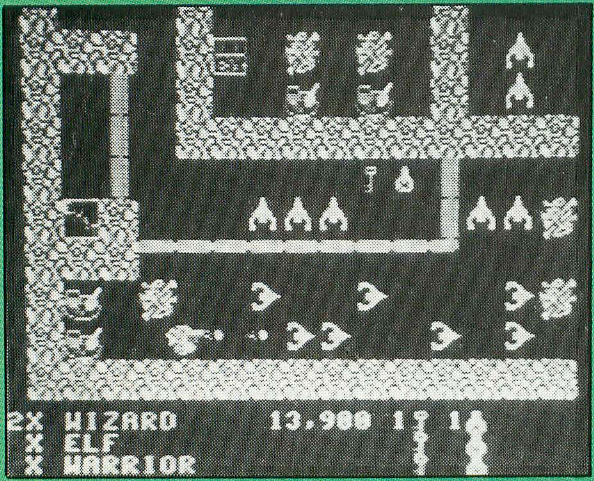
C2
MR DAVID KELLMER
3125 N FARRAGUT
PORTLAND OR 97217

10

0 44254 00001

DIECOM PRODUCTS

GANTELET

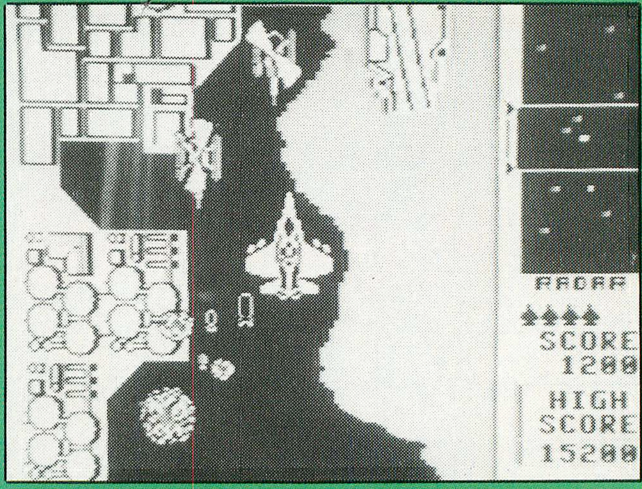


One, two or even three people can play Gantelet at the same time. You and your friends travel through the many levels in search of an exit to the next level. Avoid the Ghosts and other creatures that are out to stop you in your quest. Collect keys to open doors, treasures and magic potions to aid you in your battle. Watch out for hidden traps as you frantically search for the exit to the next level.

64 k required
tape or disk

$28.95 U.S.
$38.95 Can.

Mission: F-16 ASSAULT

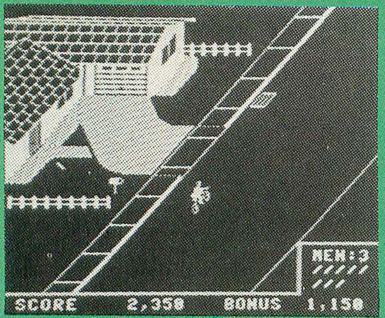


Fly your plane over land and water while avoiding enemy missiles, planes and helicopters attacking from the top and bottom of the screen. Use your radar to track objects as they approach the main screen. Bomb oil refineries, airports and destroy planes before they can take off from the airports. Watch out for missiles fired from hidden missile silos on the ground. Dozens of screens of detailed terrain plus increasing difficulty make this a great game for everyone.

64 k and joystick required
tape or disk

$28.95 U.S.
$38.95 Can.

PAPER ROUTE

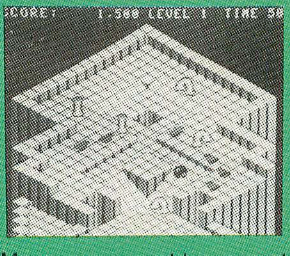


As a paper boy, you ride your bike along your route delivering papers to your customers. Break customers' windows or damage their property and they will cancel their subscriptions! Earn bonus points by damaging non-subscribers' property. Avoid pedestrians, cars, and maybe even a mad dog in your attempt to deliver all of your papers! Detailed graphics and lots of surprises make this game a real challenge for everyone.

64 k
joystick required
tape or disk

$28.95 U.S.
$38.95 Can.

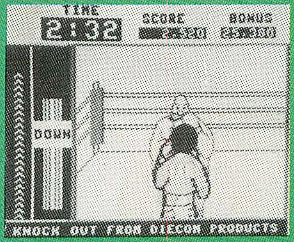
MARBLE MAZE



Move your marble around the mazes in your search for the finish line! Avoid marble eaters, acid puddles and other creatures that inhabit the mazes. Eight different levels and great graphics make this game a must for your collection.

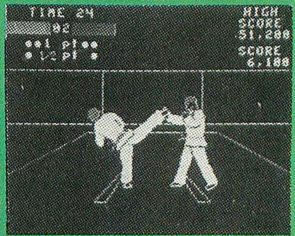
joystick required

KNOCK OUT



Fight against five different boxers in this great boxing game! At first the boxers are easy to knock out, but beware, it gets harder as you move on. The boxers are out to stop you in your quest to become champion of the world. Outstanding graphics make this a must for your collection!

KARATE



Challenge the computer, or a friend to a Karate match! Use various Karate punches and kicks to knock your opponent down and earn points to win the match. When challenging the computer, your opponent's Karate skills increase as you win matches. This game is a challenge for even the expert game player.

joystick required

64 k required tape or disk $28.95 U.S. $38.95 Can.

COMING SOON:
Mission:
RUSH'N ASSAULT

DIECOM PRODUCTS

6715 FIFTH LINE, MILTON, ONT., CANADA L9T 2X8

We accept:
VISA MasterCard
cheque or money order

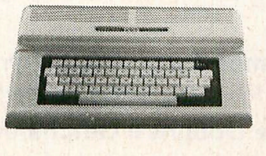
24 hr. order line:
(416) 878-8358
personal service 9-5

Please add $2 for shipping & handling. Ontario residents add 7% sales tax.
C.O.D. Canada only.
Dealer inquiries invited
Looking for new software.

From Computer Plus to YOU . . .

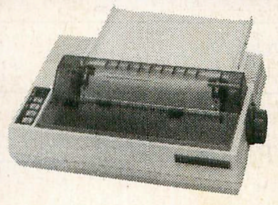
PLUS *after* PLUS *after* PLUS

Tandy 200 24K $649
Tandy 600 32K $1269
Tandy 102 24K $395

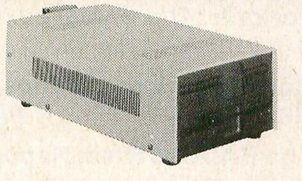


Color Computer II
w/64K Ext. Basic $145
COCO III 128K $169

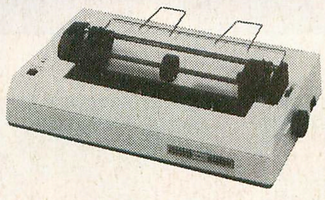
Tandy 1000 EX $569
Tandy 1000 SX $839.
Tandy 3000 HL $1229.



DMP-130 $269



Color Computer Disk Drive
Drive 0 $239 Drive 1 $179



DMP-105 $160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 EX 1 Drive 256K	569.00
Tandy 1000 SX 2 Drive 384K	839.00
Tandy 3000 1 Drive 512K	1759.00
Model IVD 64K with Deskmate	889.00
PRINTERS	
Radio Shack DMP-105 80 CPS	160.00
Radio Shack DMP-130 100 CPS	269.00
Radio Shack DMP-430 180 CPS	559.00
Radio Shack DWP-220 Daisy Wheel	359.00
Silver Reed EXP-500P Daisy Wheel	229.00
Star NX-10 120 CPS	279.00
Star SG-15 120 CPS	410.00
Panasonic P-1091 120 CPS	259.00
Panasonic P-1092 180 CPS	339.00
Okidata 292 200 CPS	529.00
Okidata 192 160 CPS	375.00
Epson LX-80 100 CPS	275.00
Epson FX-85 160 CPS	419.00
MODEMS	
Radio Shack DCM-3 Modem	52.00
Radio Shack DC Modem Program Pac	79.00
Radio Shack DC Modem 2212	315.00
Hayes 300 Baud Modem	169.00

COLOR COMPUTER MISC.	
Radio Shack Drive Controller	99.00
Extended Basic Rom Kit	39.95
64K Ram Upgrade Kit	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HJL Keyboard Upgrade Kit	79.95
COCO Max Y Cable	27.95
Color Computer Mouse	44.00
Multi Pack Interface	89.00
Botek Serial to Parallel Conv.	69.95
Radio Shack CCR-81 Recorder	52.00
Radio Shack Deluxe Joystick	26.95
Amdek Video 300 Green Monitor	139.00
Amdek Video 300 Amber Monitor	149.00
Goldstar Green Monitor	85.00
Goldstar Amber Monitor	85.00
Radio Shack VM-4 Green Monitor	99.00
Mark Data Universal Video Driver	29.95

COLOR COMPUTER SOFTWARE

	TAPE	DISK
Approach Control Simul.	29.95	34.95
Worlds Of Flight	29.95	32.95
Mustang P-51 Flight Simul.	29.95	34.95
Spectral Typing Tutor	19.95	22.95
Dungeon Quest	24.95	27.95
Major Istar	24.95	27.95
Sam Sleuth Private Eye	24.95	27.95
Mark Data Graphic Adven.	24.95	27.95
COCO Util II by Mark Data		39.95
COCO Max by Colorware	69.95	
COCO Max II by Colorware		79.95
AutoTerm by PXE Computing	39.95	49.95
TelePatch by Spectrum		19.95
TeleWriter 64	49.95	59.95
Deft Pascal Workbench		99.95
Deft Extra		39.95
Pro Color File Enhanced 2.0		59.95
Max Edit by Derringer		19.95
Elite Calc	69.95	69.95
Elite Word	69.95	69.95
Elite File (disk only)		74.50
DynaCalc (disk only)		99.95
Word Pack RS by PBJ		99.00
VIP Writer (tape & disk)		69.95
VIP Integrated Library (disk)		149.95

Order any 2 software pieces listed and take 10% off their listed price. All Radio Shack software 10% off list. Send for complete list.

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

Under The RAINBOW

FEATURES

Bombs Away/*Allen Drennan* 18
GAME *Trigger-happy combatants are headed for trouble*

The Goblins'll Getcha/*Jean and Al Duerig* 26
ADVENTURE *A children's trick-or-treat Adventure*

Power of the Palette/*Rick Adams and Dale Lear* 37
COCO 3 CAPABILITIES *Graphics on the Color Computer 3*

Transfiguration Band/*Ronald T. Robson* 44
GRAPHICS UTILITY *Stretch, reduce and enlarge your drawings*

Portraits/*Ann B. Mayeux* 49
GRAPHICS *A fun way to capture that special face*

CoCoDraw Concoctions/*Darin Herr* 58
GRAPHICS UTILITY *A Hi-Res graphics editor for artists*

The RAINBOWfest Reporter/*Jeffrey Parker* 83
SHOW NOTES *A look at the Chicago show*

Inside the CoCo 3/*Marty Goodman* 90
COMMENTARY *Some observations on the new Color Computer*

Dissecting the CoCo 3/*Cray Augsburg* 94
TUTORIAL *A look at the internal hardware*

Don't String Me Along/*Ellen and George Aftamonow* 100
TUTORIAL *Use this technique to find FC Errors*

Double Whammy/*Bill Bernico* 101
GAME *Keep your greed under control to win*

The CoCo 3/*Marty Goodman* 104
FORUM *Questions and answers about the new computer*

Graphics Quickies/*RAINBOW Readers* 108
GRAPHICS *Four fast frolics for fun*

Optimum Animation/*Steven R. Polsz* 116
TUTORIAL *Get better graphics while using less memory*

Odd Man Out/*Harold Schneider* 125
EDUCATION *Learn reasoning, colors and shape discrimination*

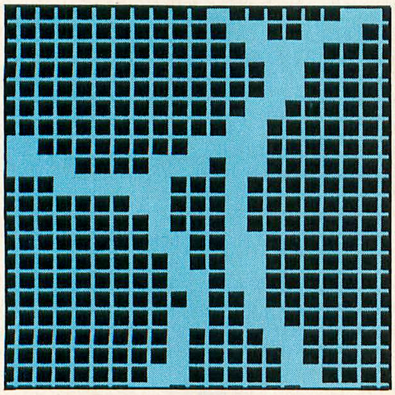
The Shock Absorber/*Marty Goodman* 158
HARDWARE PROJECT *A spike and surge protector for the CoCo*

The CoCo Scaler/*Wayne Womack* 166
GRAPHICS UTILITY *An easy-to-use detailer for CoCo pictures*

Picture Changer/*Jeff White* 182
DISK UTILITY *Eliminate extension changing hassle*

26

58


166

Cover illustration copyright © 1986 by Fred Crawford

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ads on pages 160 and 80.

NEXT MONTH: As the chill winds of November blow, what better time to retreat to your trusty CoCo and get in touch with our annual Data Communications issue.

Online information services are the wave of the future and THE RAINBOW is here with answers and information for all your BBS and telecommunication questions.

Plus, we have more games, programs for the home, educational material and information on the Color Computer than is available anywhere else.

Look for November's RAINBOW!

COLUMNS

BASIC Training/*Joseph Kolar* 77
Learning how to function in BASIC

Building October's Rainbow/*Jim Reed* 16
Managing Editor's comments

CoCo Consultations/*Marty Goodman* 180
Just what the Dr. ordered

Delphi Bureau/*Cray Augsburg* 154
Workspace commands and Goodman's database report

Education Notes/*Steve Blyn* 152
Back to basics with an adjective review

Education Overview/*Michael Plog, Ph.D.* 164
Sexism in the computer industry

PRINT#-2,/*Lawrence C. Falk* 12
Editor's notes

Turn of the Screw/*Tony DiStefano* 161
Hardware fixes for the VDG

Wishing Well/*Fred B. Scerbo* 173
Driller II is a thriller, too

RAINBOWTECH

Downloads/*Dan Downard* 194
Answers to your technical questions

KISSable OS-9/*Dale L. Puckett* 196
Revving up for fall fun

Bill Barden and Richard White will return next month

DEPARTMENTS

Advertiser Index 208
Back Issue Information 137
CoCo Clubs 189
CoCo Gallery 122
Corrections 92
Letters to Rainbow 6
One-Liner Contest Information 40
Rainbow Info 15
Received & Certified 131
Reviewing Reviews 132
Scoreboard 96
Scoreboard Pointers 98
Submitting Material to Rainbow 178
Subscription Information 24
These Fine Stores 206

PRODUCT REVIEWS

Product Review Contents 129

The RAINBOW

October 1986 Vol. VI No. 3

Editor and Publisher
Lawrence C. Falk

Managing Editor James E. Reed
Senior Editor T. Kevin Nickols
Submissions Editor Jutta Kapfhammer
Copy Editor Jo Anna Wittman Arnott
Reviews Editor Judi Hutchinson
Editorial Assistants Judy Brashear, Wendy Falk, Jody Gilbert, Angela Kapfhammer
Technical Editor Dan Downard
Technical Assistants Cray Augsburg, Chris Wehner
Contributing Editors William Barden, Jr., Steve Blyn, Tony DiStefano, Joseph Kolar, Michael Plog, Dale Puckett, Fred Scerbo, Richard White
Consulting Editors Ed Ellers, Danny Humphress, Belinda C. Kirby

Art Director Heidi Maxedon
Production Coordinator Cynthia L. Jett
Designers Judy Colgate, Tracey Jones, Sandra Underwood

Chief of Typography Debbie Hartley
Typography Services Jody Doyle, Suzanne Benish Kurowsky

Falsoft, Inc.
President Lawrence C. Falk

General Manager Patricia H. Hirsch
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Sue E. Rodgers

Editorial Director James E. Reed
Asst. Editorial Director Jutta Kapfhammer
Creative Director Heidi Maxedon

Chief Bookkeeper Diane Moore
Advertising Accounts Beverly Taylor
Dealer Accounts Judy Quashnock
Accounts Payable/ADP Lisa Ragan
Fulfillment Services Director Bonnie Frowenfeld
Fulfillment Services Asst. Dir. Sandy Apple
Asst. Customer Service Mgr. Beverly Bearden
Word Processor Manager Patricia Eaton
Development Coordinator Ira Barsky
Chief of Printing Services Melba Smith
Pre-press Production John Pike
Dispatch Janice Eastburn
Asst. Dispatch Mark Herndon
Business Assistants Laurie Falk, Sharon Smith, Monica Wheat, Pam Workhoven

Advertising Coordinator Doris Taylor
Advertising Representative Kim Vincent
Advertising Assistant Debbie Baxter
(502) 228-4492

West Coast Advertising and Marketing Office
Director Cindy J. Shackleford
Advertising Representative Shirley Duranseau
For RAINBOW Advertising and Marketing Office Information, see Page 208

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, *phone* (502) 228-4492. **THE RAINBOW, RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered ® trademarks of FALSOFT, Inc. • Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Forwarding Postage Guaranteed. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada. • Entire contents copyright © by FALSOFT, Inc., 1986. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. • Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp. • Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. • Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

LETTERS TO THE RAINBOW

Keep Those Converts A-Comin'

Editor:

Congratulations to the CoCo Community on the arrival of the new Color Computer 3!

As a current non-member of the community (but an interested party), I expect the new CoCo 3 will make quite a few converts. I, for one, have been hesitant to buy a CoCo, despite the many hardware options available for it, and the low cost of OS-9, because of its graphics limitations. But no more! With this latest version, the CoCo rivals the Atari ST in the graphics department, and moves well into the world of serious computers. And at a price of less than $220, it is easily affordable.

Closely priced competitors will likely feel the pinch. If software developers are quick to react, the CoCo could enjoy fantastic Christmas sales. (A version of *CoCo Max* alone that takes advantage of the higher resolution modes would sell thousands.)

A message for CoCo software developers: You have a tremendous opportunity here — don't let it go to waste!

This is one non-CoCo owner who does not intend to stay that way any longer than necessary!

Lonnie McClure
Memphis, TN

BACK TALK

Editor:

As the owner of Software Corner, a computer store specializing in software and hardware for the CoCo, I was sorry to read the letter in the August 1986 issue [Page 6] of RAINBOW from Bill Vergona. I really feel for Bill, as well as many other programmers, who spend endless hours programming to give the CoCo Community quality software only to have someone steal it. It is not only the giver, but also the receiver, who is breaking the law. I've heard all kinds of excuses from people justifying these acts and not one of them holds water.

I am an independent third party dealer, and these pirates hurt me just as they hurt the programmers. One of my customers made the statement, "I haven't heard of any companies going out of business because their software is being pirated." Just look at an old issue of THE RAINBOW and see how many of those advertisers are still advertising, and how many dropped out because illegal copies of their software forced them out, and how many of the pirated programs were unjustly criticized because there were no instructions with them.

Thank you for listening, and thanks to all the programmers out there who have gotten the CoCo this far!

Linda Brubaker
Software Corner
Temple, PA

HINTS AND TIPS

Editor:

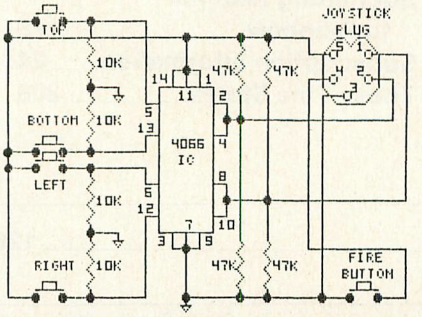
Any readers who are using a JUKI 6100 printer and are interested in adjusting word processing files for printing by a proportional spaced wheel, please write to me at P.O. Box 506, 06410. I have a working program I would like to share and have tested by users.

Joseph P. Laronda
Cheshire, CT

Wireless Joystick, Part Two

Editor:

Here is a schematic to modify an Atari joystick to work with the Color Computer.



I took most of the information from the June 1985 [Page 105] article on the wireless joystick and made small modifications so the circuit can be mounted inside the joystick. I have modified one joystick and it's working fine.

Is there a good program for the CoCo 2 like the *Greeting Card Designer* that has different graphics, letter type and border shape on disk that can be used to fill a complete page? I have a Star SG-10 printer.

Do you have a utility program to keep track of all the programs on a disk, add or modify the list and do a printout when needed? Send information to P.O. Box 46, CFS Senneterre, J0Y 2C0.

Andre Bergeron
Nottaway, Quebec

A correction to the referred article appeared on Page 224 in the August 1985 issue.

Please look over the ads that appear in RAINBOW every month. There are several utility programs on the market that will do the job you're looking for.

Peeking at Function Keys

Editor:

For those who have purchased the HJL-57 keyboard and use ADOS, the function keys (F1, F2, F3, F4,) do not work. If your keys do work, they can be used for things such as selecting options in menu-type programs.

The keys are monitored by the keyboard rollover table, memory addresses 338-345 (decimal) and can be used through a simple `PEEK`:

If F1 is pressed, `PEEK(341)=191`
If F2 is pressed, `PEEK(342)=191`
If F3 is pressed, `PEEK(343)=191`
If F4 is pressed, `PEEK(344)=191`

I hope someone can make use of these keys as I have.

Eric Santanen
Stanhope, NJ

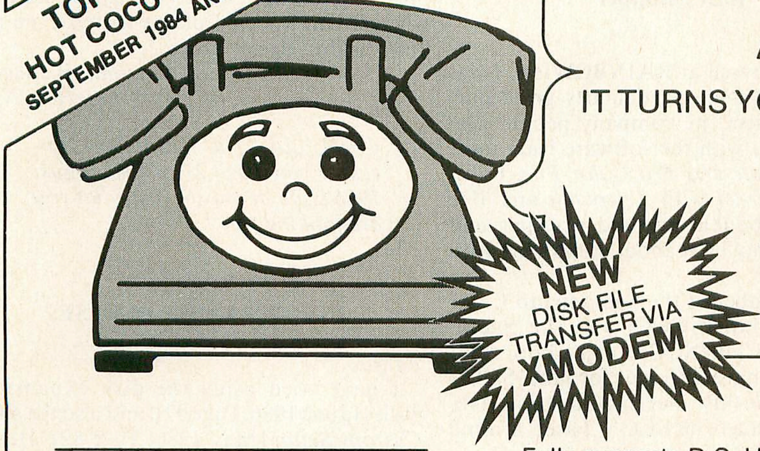
Art Gallery Tid Bits

Editor:

Recently one of the local Radio Shack stores was selling the *Art Gallery ROMpack* for $5. After opening the package and trying a little bit, I found a few things that some RAINBOW readers may find interesting.

On computers with disk drives and with

TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984 AND MAY 1985



YOU COULD FALL IN LOVE WITH

AUTOTERM!

IT TURNS YOUR COLOR COMPUTER INTO THE

WORLD'S SMARTEST TERMINAL

AND MOST LOVABLE

GOOD LOOKIN'

AUTOTERM shows true upper/lower case in screen widths of 32, 40, 42, 51, or 64 characters with no split words. The width of 32 has extra large letters. Scrolling is forward, backward, and fast. Block graphics pictures are displayed automatically and can be scrolled.

The screen's top line shows operating mode, unused memory size, memory on/off, and caps-lock on/off. It also gives helpful prompts.

SWEET TALKIN'

KEY-BEEP can be on/off. Unacceptable keystrokes cause a lower pitched BOP! This ERROR-BEEBOP can be on/off.

Talks to other computers with Full or Half Duplex; Baud Rate of 110, 150, 300, 600, 1200; Parity as even, odd, mark, space, none; 7 or 8 bit Word; any Stop Bits; all 128 ASCII characters; true line Break; XON/XOFF protocol; and optional line-at-a-time transmission. Able to send and receive text, block graphics, BASIC and ML programs. A 64K machine holds up to 45,000 characters (33,300 in HI-RES).

DUAL PROCESSING lets you review & edit while more data is coming in.

XMODEM for disk file transfer.

Fully supports D.C. Hayes and other intelligent modems.

Talks to your printer with any page size, margins, line spacing, split word avoidance. Embed your printer's control sequences for boldface, underlining, etc. Narrow text can be automatically spread out.

You'll also use Autoterm for simple word processing and record keeping

You can display directories, delete files, transmit directly from disk, and work with files larger than memory. Easily maintain a disk copy of an entire session.

Compatible with TELEWRITER (ASCII) & other word processors.

SMOOTH WALKIN'

AUTOTERM moves smoothly and quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text, download information, file it, and sign-off; then edit the received data, print it in an attractive format, and/or save it on file.

Editing is super simple with the cursor. Find strings instantly, too! Any operating parameter, such as screen width, can be altered at any time. Uncompleted commands can be cancelled.

PUTTY IN YOUR HANDS

The word processor can be used to create, print, and/or save on file your personal KSMs. They let AUTOTERM act like you. For example, it can dial through your modem, sign-on, interact, perform file operations, & sign-off; an entire session without your help. KSMs can answer the phone, prompt the caller, take messages, save them, hang-up, and wait for the next call. The KSM potential is unbelievable!

NO OTHER COMPUTER IN THE WORLD CAN MATCH YOUR COCO'S AUTOMATIC TERMINAL CAPABILITIES!!!

WHAT THE REVIEWERS SAY

"AUTOTERM is the Best of Class."
Graham, *RAINBOW*, 6/83

"The AUTOTERM buffer system is the most sophisticated — and one of the easiest to use..."
Banta, *HOT CoCo*, 9/84

"Almost a full featured word processor..."
Ellers, *RAINBOW*, 11/84

"AUTOTERM's excellent error-handling routines, thorough documentation, and logical, easy-to-use command structure make it stand out."
Parker, *HOT CoCo*, 5/85

AVAILABLE IN CANADA
from
Kelly Software Distributors
Edmonton, Alberta

CASSETTE $39.95
DISKETTE $49.95
Add $3 shipping and handling
MC/VISA/C.O.D.

PXE Computing
11 Vicksburg Lane
Richardson, Texas 75080
214/699-7273

Please hire the mentally retarded. They are sincere, hard working and appreciative. *Thanks!* *Phyllis.*

the disk controller in the ROM port, after turning the computer on, try this:

1) `POKE 25,14 : POKE &HE00,0` and press ENTER.
2) `CLOAD` and ENTER with the *Art Gallery* data tape in cassette recorder.
3) After receiving the `OK` prompt, type `PCLEAR 4` and press ENTER.
4) Write a BASIC line: `10 PMODE 1,1 : SCREEN 1,1 : GOTO 10`
5) Run this small basic line to see the results.

On cassette based systems, the first step should be: `POKE 25,6 : POKE &H600,0` and press ENTER.

With this method, you can save the *Art Gallery* on a disk. Anyone having improvements in this procedure is invited to write me at 1423 N. Cleveland Street, 92667.

Ashok Basargekar
Orange, CA

Recognition Requested

Editor:

I just reread Susan Davis' April 1984 [Page 215] article on "Women and the Color Computer," and I agree with the description of the problem, though not necessarily with the solution. The CoCo world seems to be a man's world.

But we, the few women who are active CoCoists, want our share and we want recognition as well. That's why I'm writing this letter: I recently contributed to "KISSable OS-9" (an excellent column) some programs and a patch to a Radio Shack screen dump. I signed my letter with my full name so there would be no doubt about it, I am a woman. Here in Curacao I am considered somewhat an expert on the CoCo.

So, I was very disappointed when, in the July "KISSable OS-9" column [Page 230], my contributions were attributed to a man. It was "he" everywhere my name was mentioned.

Please, RAINBOW, "she." Please correct this error. We women in CoColand are few, but we want recognition, not recipe filing programs. I use my CoCo at work for technical calculations, budgeting and word processing. I use the one at home to write programs and generally explore the CoCo to its limits.

As for software wishes, how about a version of OS-9 *Dynacalc* that is compatible with the O-Pak 85 cpl Hi-Res utility and doesn't eat up all available memory?

Margo H. Guda
Curacao, Neth. Antilles

Our apologies! No slight intended at all; that's the way we received the material from the author, and your exotic Caribbean location must have diverted our attention momentarily. Vive la difference!

Margo, you may find the article on Page 164 particularly interesting.

Wise Shopper

Editor:

I enjoyed myself at RAINBOWfest. I was able to make some particularly good purchases and meet the company people who could help me with the software I use most often, *Dynacalc* and *Pro Color File*. I also use *Telewriter-64* with *Telepatch* and *Wiz Font*. I am a bookkeeper and a cashier, and am teaching my boss about computers with my own setup.

I am a member of the Sacramento Color Computer Club (SCCC) and the Sacramento CoCo Club (SCC). I enjoy both clubs because they have different formats. SCCC plans its monthly meetings around THE RAINBOW theme. The SCC is based around a bulletin board.

Shelby J. Dunning
Sacramento, CA

REQUEST HOTLINE

Editor:

I am looking for a tennis Simulation game. Are there any for the CoCo? My address is 241 Stiener Avenue, 83440.

Jeremy Hackworth
Rexburg, ID

Swing To the Left, Do-Si-Do

Editor:

I am a square dance caller and wonder if there is anyone who has a program that can be used for choreography of movements. I own a CoCo with two disk drives and a DMP 105 printer. Any help would be appreciated. Write me at 228 Kingsway, L3B 3N9.

Terry Kallender
Welland, Ontario

Hilfe, Bitte

Editor:

I recently purchased a Radio Shack DMP 120 printer. This printer has the German alphabet, but it seems no one knows how to use it. I do a lot of corresponding with people in Germany and having access to this capability would help a lot. I would appreciate any assistance. My address is 431 Bass Avenue NE, 98568.

Arnold D. Samuels
Ocean Shores, WA

Medical Madness

Editor:

I am knee-deep in trying to track medical expenses, insurance claims, reimbursements, etc. I would like to know if anyone has a disk program for a 64K CoCo 2 that could bring some organization to my medical madness? Write to me at P.O. Box 387, 36559.

Dave Willette
Montrose, AL

Custom Adventures

Editor:

I am looking for an Adventure designe program for a cassette. If anyone know where I can get one, please write to me a 266 Sheldon Road, 13068.

Jonathan Wanage
Freeville, N

Check out "The Adventure Processor" on Page 27 of the August 1986 issue. It may be just what you are looking for.

INFORMATION PLEASE

Editor:

I have tried using the disk expansio utility [June 1986, Page 92], and also the *64 Custom Setup* [May 1986, Page 82]. How ever, they both need you to transfer th ROM to RAM or the all-RAM mode. Ho do you do this?

Ian Boisve
Burstall, Saskatchewa

See "Downloads" on Page 234 of the August 1985 issue. Read the answer to Jerome P. Cigna's question.

The "Other" 32K

Editor:

I have an old 64K CoCo. I would like t know if it is possible to get 64K of RAM from BASIC without having to buy the OS 9 operating system. I would appreciate an help you can give.

David Ardil
Bogota, Colombi

The CoCo is designed to access only 32K at one time for BASIC programs.

Elementary Education

Editor:

I have a 16K Color Computer 2 and recorder. I am interested in obtaining edu cational tapes or programs to use for preschooler and third grader. If anyone ha any information about such programs, writ to me at 808 Villere Street, 39576.

Dawn Perkin
Waveland, M

Check the Computer Island Educational Software ad on Page 154 in the August 1986 issue.

A Sorry State

Editor:

Why can't I find programs for the CoC that resemble *PrintShop* and *NewsRoom* There are some very neat and useful pro grams on the market for other computers Yes, I have *CoCo Max* and others bu nothing that measures up to *PrintShop* which is available for almost everythin except the CoCo. It's always the same ol story, it seems. Help! My address is 1206 Via Pavion, 93455.

R.E. Newman
Santa Maria, CA

See "KISSable OS-9," August 1986, Page 201 under the heading, "Good News for Graphics Programmers."

KUDOS

Editor:

I was very pleased when I read "Building July's Rainbow." I was concerned about THE RAINBOW supporting the present CoCo after the new CoCo is introduced. I am relieved to know you will still support the present CoCo. I think that THE RAINBOW is the best!

Christopher Romance
Massapequa Park, NY

Keep on Converting

Editor:

As soon as I got the August 1986 RAINBOW, I started leafing through it as I usually do. Lo and behold I found *Fortune Wheel* [Page 156]. I jumped into my computer seat and started typing away. After a few hours I had the game ready to play. The reason for my excitement was that my whole family loves "Wheel of Fortune." We played *Fortune Wheel* for two and a half hours and loved every minute of it. We decided to play on a regular basis. I want to publicly thank and congratulate Arron Branigan on a job well done. Mr. Branigan, maybe you can find the time to convert the TV game version of "Scrabble" to a CoCo program. I think it would be an excellent game just like *Fortune Wheel.* I hope you keep writing programs and I hope THE RAINBOW keeps publishing them.

Arie Moller
Kensington, MD

Missing Out

Editor:

Why did you make "Scoreboard" a bimonthly column? I love the pointers. When I get stuck on an Adventure or a game, I have to wait two months for the next "Scoreboard Pointers" to look for help. I wish you would bring it back on a monthly basis.

How about putting the one- and two-liners in the Table of Contents? I am always afraid I missed the most important one-liner in history because they are scattered throughout the magazine. Even though I go cover to cover, there is always the chance of missing one. I think an entire section devoted to each month's one- and two-liners would be a great idea!

Even though THE RAINBOW is the greatest, I think there is always room for improvement.

Brian Biggs
Grove City, OH

CoCo Cats Art

Editor:

This grandfather/granddaughter pair is still very much enjoying learning all the aspects of home computering with the CoCo. Grandfather Jim is an engineer with a local television station and Beth is a 13-year-old student who resides in The Colony, Texas. Our families think we are two CoCo Nuts out of our palm tree but we treat them with the milk of human kindness.

Jim Franklin
Paducah, KY

Soliciting Suggestions

Editor:

I would like to thank the staff at THE RAINBOW for producing such a fine magazine every month. Without it, my computer would just be an expensive paperweight on my desk.

I am in the process of writing a farm accounting and inventory program and would appreciate hearing from farmers with any thoughts and suggestions. Please write to me at R.R. 1, Box 103, 57278.

I would like to hear from anyone with information about the Laser 50 Personal Computer. I acquired one without any instructions. I want to know about getting or making a cassette and printer interface for it. I also want to know if it is still possible to get the 4K memory module for it.

Mike McPeek
Willow Lake, SD

I Can Do It

Editor:

If anyone would like programming done on the Color Computer 2, send me a letter and I'll return it with a questionnaire. Write Fewster Originals, 151 Westwood Manor I, 16001.

John Fugh, Jr.
Butler, PA

The Book of Lists

Editor:

I would like to have a list of all your issues, their subjects and all the games and one-liner programs.

Chad W. Johnson
Orfordville, WI

For a list of available issues and their subject theme see "Back Issue Order Form" on Page 138 of this issue.

For a list of games you'll have to refer to our indexes. They are available in the July 1984, 1985 and 1986 issues.

BULLETIN BOARD SYSTEMS

Editor:

Please list the following California Computer Federation Bay Area Chapter BBSs:

Presidio BBS, SysOp Dan Eckert, (415) 567-3287.

Redwood Gator Board, SysOp George Sandufer, (415) 364-6630.

Colorboard of San Francisco, SysOp Brad Ryan, (415) 591-7366.

Vallejo Colorboard, SysOp Woody Stolling, (707) 557-9221.

Los Altos Colorboard, SysOp Bob Webster, (415) 965-7949.

Hal 2001, SysOp Ronnie Van Scherpe, (415) 345-1802.

Dan Eckert
Presidio, CA

- I would like to announce a BBS designed specifically for the Color Computer. It operates at 300/1200 Baud, 24 hours a day, 7 bit word length, even parity and 1 stop bit. Call (818) 786-9052.

Cliff Redding, SysOp
Van Nuys, CA

- I would like to announce the start of The Buck Board BBS. It runs 24 hours a day, seven days a week and offers CoCo support. Baud rates are 300/1200. Call (303) 427-9539.

Lee R. Castens
Westminster, CO

- I would like to inform your readers of a new BBS in the tri-state area called The Angola Connection. We have a small membership of 40 users, but are capable of 100 downloads online at all times. Call (219) 665-3028 anytime at 300 Baud.

Eddie Nast
Angola, IN

- The Indy Color Computer Club sponsors the ICCC Hotline BBS. Baud rates are 300/1200. Call (317) 873-5808.

Kevin S. Jessup, Sr.
Lawrence, IN

- I am happy to announce southeastern Kentucky's only BBS in the Hazard-Perry county area. It is called the Coalminer's BBS. The hours are 11:30 p.m. to 8 a.m. seven days a week. Settings are 300 Baud, full duplex, 7 bits and no parity. Call (606) 439-4209.

Keith W. Smith
Hazard, KY

- This is to announce the Exotic Zone BBS. It is up 24 hours a day. Call (301) 969-3083.

Vallie Ingson
Glen, MD

- I am happy to announce the new Lin-Wood BBS. Call (603) 745-8811, online 9 p.m. to 7 a.m. seven days a week. This BBS is free access and contains E-mail, downloads, adds, scoreboard and much more.

David Selby, SysOp
N. Woodstock, NH

- I would like to announce the Colour Kraft BBS of Rahway. It runs nonstop at 300/1200 Baud, supports a comprehensive CoCo download section and has a large message base. Immediate full system access assured at logon. Call (201) 396-4361 anytime. Voice (201) 381-9047.

Jay Needham
Rahway, NJ

- Announcing Matthews Coloring Book BBS. It operates at 300 Baud N, 8, 1, 6 p.m. to 6 a.m., Monday through Friday and 24 hours on the weekend. Call (704) 847-7781. Runs on a 64K CoCo using a Colorama system.

Tim Bohnslav
Matthews, NC

- Call The Utopia Network #1 BBS at (614) 622-0565. We are using our own written software. To log on use 300 Baud, full duplex and even parity. We have over 200 programs available for download and several other features. The hours are from 7 p.m. to 6 a.m. every evening.

Bruce Uher
Coshocton, OH

- I would like to welcome all to the opening of the Toledo area Colorama BBS serving most of northwest Ohio. We operate at 300 BPS (soon to be 1200) 24 hours a day. Call (419) 877-0556.

John Kendziora, SysOp
Whitehouse, OH

- I would like to announce the changing of the phone number for the Fun BBS. The new number is (412) 378-1323. We have upgraded to an RS-232c Pak and added our fourth disk drive to the system. There are many new online games, etc. We have ASCII up/downloading. The system is free. Call today and get a password.

Robert Chalupa, SysOp
Aliquippa, PA

- I would like to announce two BBSs which run 24 hours a day.

LABB (Lancaster Area Bulletin Board) uses a TRS-80 Mod #3 computer. All are welcome, but you must become a full member to access the library of programs. There is a section for CoCo computers. Call (717) 394-1357.

Byte Bucket BBS runs on an Intel computer. There is a section for CoCo users for questions and suggestions. There is also a free library of programs for CoCo users. Call (717) 569-9967.

Mike Nelson
Lancaster, PA

- I would like to inform you of a new BBS called St. Elmo's Bar. It runs on a 64K CoCo 1 with four drives. Call (817) 244-6686. The BBS is up 24 hours a day, seven days a week. Also, I was wondering if anyone knows where I could find a copy of the TBBS programs. Write to me at P.O. Box 26689, 76126.

Chris Young
Benbrook, TX

- I would like to announce the reopening of the Flying Fortress BBS. It's now running 24 hours a day, seven days a week at 300/1200 Baud. Call (214) 686-4796.

Eric Hedstrom
Garland, TX

- The Salt Lake City CoCo Club is running The Data Warehouse BBS. Call (801) 487-6787 — 24 hours a day, seven days a week, 300 Baud, 7 bits, no parity.

Dennis Mott
Salt Lake City, UT

- Announcing a new BBS in Virginia. Call (703) 573-2246, 300 Baud.

Phillip Taylor
Vienna, VA

- I would like to announce the Madison Area Tandy Users BBS in the Madison area. The board is up 24 hours a day, seven days a week. There are sections for MS-DOS, TRS-DOS, Model 100/200, buy and sell, and of course, the Color Computer. There is also an up/download section. The board is running at 8-1-N. Call (608) 273-6922.

Fran Selje
Marshall, WI

- There is a new BBS in the Kenosha-Paddock Lake area called Uncle Dave's BBS. It runs 24 hours a day, seven days a week. Call (414) 843-4029.

David Buehn, SysOp
Paddock Lake, WI

- I would like everyone to know about my BBS. Call (800) 233-7513. Hope to see lots of RAINBOW users on it. To get on, type `NEW` at the ID prompt and `NEW` at the password prompt.

Paul Fielding
Red Deer, Alberta

- I would like to tell you about CoCoPad, the only CoCo BBS in Saint John. The terminal settings are 300 Baud, 7 bit, even parity and 1 stop bit. Call (506) 652-2654. SysOp is Gord Peterson.

Steven L. LeBlanc
Saint John, New Brunswick

- Call The Redbaron BBS at (416) 668-2078, 300/1200 Baud, no parity, 8 bits (or 7 bits) and 1 stop bit. Runs 24 hours a day. The Redbaron has been up for four years. We have SIG sections for the CoCo. When you connect to the board, press ENTER once or twice to activate the board.

Steven Cavanaugh
Whitby, Ontario

- Joliette has a new COBBS-BBS for CoCo clubs, E-mail, graphics, Xmodem, up/downloading news. It runs 24 hours a day, seven days a week. All in French. We welcome all CoCo users. Call (514) 753-5655.

A. Veillette
Joliette, Quebec

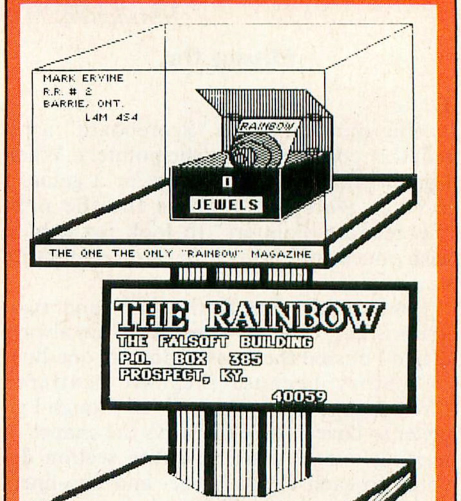
- A new BBS is now running in Riviere-du-Loup. Has 300 Baud, full duplex, 8 bits, parity none, 1 stop bit. This BBS is not only for posted and read messages but there is a big part for information. The BBS is in French! Call voice (418) 862-5074 or BBS (418) 862-9750.

Erik Gendron
Riviere-du-Loup, Quebec

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

Letters to the editors may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

ARTS AND LETTERS



Mark Ervine
Barrie, Ontario

Envelope of the Month

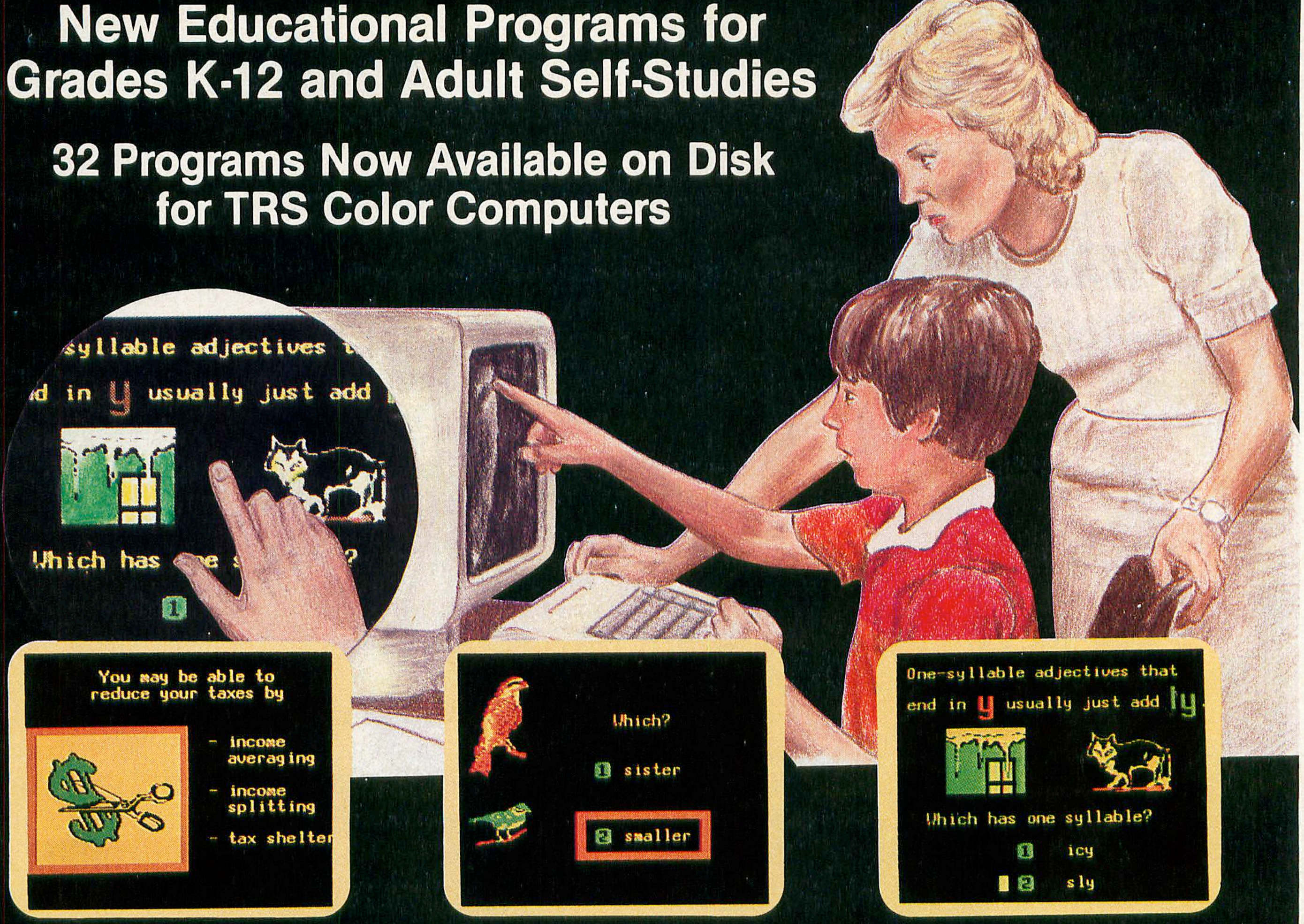
Now! 500 new programs for the Tandy 1000!

For Your TRS-80 Color Computer

Apple - Atari - Commodore - TRS 80 I, III, 4 & Color - IBM PC Jr. - Tandy 1000

New Educational Programs for Grades K-12 and Adult Self-Studies

32 Programs Now Available on Disk for TRS Color Computers


syllable adjectives t
d in y usually just add
Which has one s ?
1
You may be able to reduce your taxes by
- income averaging
- income splitting
- tax shelter
Which?
1 sister
2 smaller
One-syllable adjectives that end in y usually just add ly.
Which has one syllable?
1 icy
2 sly

Interactive Tutorial Programs for Home or Classroom Use

Over 1000 programs for your selection with 32 now available on disk for the Color Computer and 500 now available for the Tandy 1000.

"We're Your Educational Software Source"

Subject	No. of Programs
Reading Development	256 (4 on disk)
Reading Comprehension	48 (4 on disk)
Mathematics	128
Algebra	16 (16 on disk)
History	32 (4 on disk)
Spelling	16
Government	16
Physics	16 (4 on disk)

16 Programs in each of the following:

Children's Tales - Carpentry - Electronics Health Services - Office Skills - Statistics First Aid/Safety - Economics - Business Accounting - Psychology - MUCH MORE!

Send for our free catalog of over 1000 Dorsett educational programs for Atari, TRS 80, Apple, IBM PC Jr., Commodore, Tandy 1000, etc.

Apple II, TRS 80 I, III, & 4, and Commodore 64 computers require respective conversion kits (plug-in board and stereo cassette player), **$99.00.** Atari 400/600/800/1200 computers require the Atari cassette recorder and the Dorsett 4001 Educational Master Cartridge, **$9.95.** For the IBM PC Jr. a cassette adapter cable and a good cassette recorder are required. The Tandy 1000 requires the Dorsett M1001 speaker/PC board kit, **$69.00,** and a standard cassette recorder. A Radio Shack CCR-81 or CCR-82 is recommended.

CASSETTES: $59.90 for an album containing a 16-program course (8 cassettes with 2 programs each); **$8.80** for a 2-program cassette.

DISKS: $14.95 for a one-program disk; **$28.95** for two disks; **$48.95** for four disks. All disks come in a vinyl album.

Dealer Inquiries Welcome

Dorsett Educational Software features:

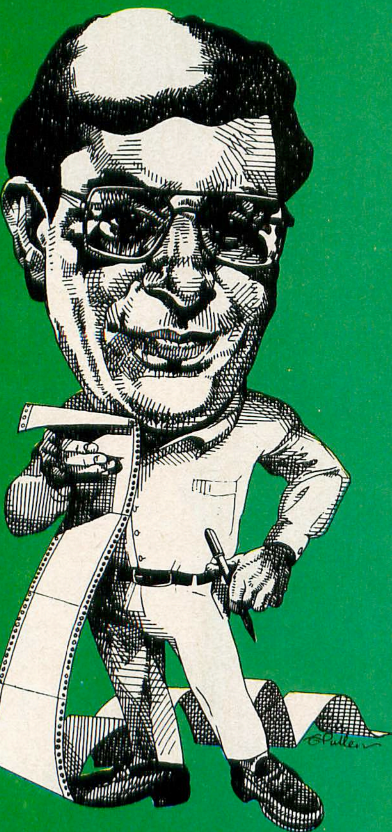
- Interactive Learning
- User Friendly
- Multiple Choice and Typed
- Program Advance with Correct Response
- Full-time audio narration (Cassette Programs Only)
- Self-Paced Study
- High Resolution Graphics
- Easy Reading Text

For more information, or to order call:

TOLL FREE 1-800-654-3871
IN OKLAHOMA CALL (405) 288-2301

MasterCard VISA

DORSETT
Educational Systems, Inc.
Box 1226, Norman, OK 73070



All Aflutter Over Our New Baby

It seems I've been whirling for a couple of weeks now, what with the new CoCo 3 announcement, getting the "special" issue of THE RAINBOW out and making some last minute changes for RAINBOWfest that will make it *the* place to be this fall.

First of all, a big vote of thanks from me to the people here at Falsoft who have been working very hard to get you all the CoCo 3 news. Jim Reed in Editorial and Heidi Maxedon in Art marshaled their forces and came out with one of the most complete pieces of fast-paced magazine journalism I've ever seen. Sure, we'll be exploring the CoCo 3 for years, but I'm happy we could give everyone a real in-depth report on our newest baby in a minimum amount of time.

Considering there was no real information available until the machine actually showed up in New York on July 30, I think the staff did a heck of a job getting the full report in the mail on August 11. Had not a weekend interfered, I think it would have been a couple of days sooner. I hope you enjoyed our CoCo 3 coverage and look forward to seeing more and more of it in the months ahead.

One place many of you got quick news was through local CoCo clubs. In fact, there has been a small avalanche of club newsletters coming in recently, all featuring the new CoCo 3 and speaking of it in glowing terms.

Frankly, I wondered just where all this information was coming from. At least until this morning when I read the Glenside (Ill.) Color Computer Club news. Said the newsletter: "Members of RAINBOW's Color Computer SIG met on Delphi tonight to discuss the new CoCo." Steve Bjork and Cray Augsburg hosted this exchange — and, for that matter, there was information on the SIG within minutes of the announcement. Sure is nice to have instant communications like that in Delphi. It was one of the service's busiest nights ever and one of the largest conferences ever!

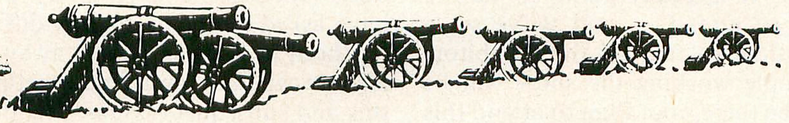
By the way, I phoned in the first bit of news to the Delphi SIG right from the news conference with my portable phone. Bernie Appel, President of Radio Shack, spotted me dictating copy and pointed out my activities to John Roach, Tandy CEO. We exchanged big smiles all around — but I didn't stop talking. UPI training will do that for you.

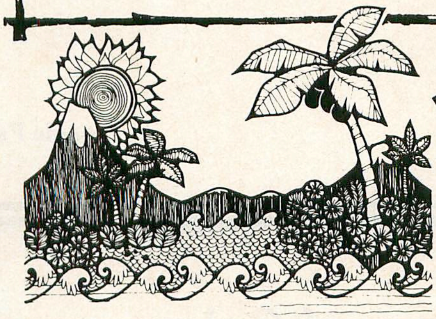
ARK ROYAL GAMES

BATTLE HYMN

THE BATTLE OF GETTYSBURG

BATTLE HYMN The Battle of Gettysburg. Command Lee's army of 39 Divisions, including Stuart's cavalry brigades, and infantry division under the command of such famous names as Johnson, Heth, McLaws, Hood, Early and Pickett. Try to do what the real Confederates couldn't: destroy Mead's army at Gettysburg. New movement and turn structure; form lines, rally, limber and unlimber cannon, backstep, and do your best to outflank the Union line at Culp's Hill, Devil's Den or Big Round top. Historical, with an Ark Royal touch. Available also on the IBM PC (Tandy 1000). Graphics are hi res; game is machine language throughout. **$29.00**





ADVENTURE ISLAND

ADVENTURE ISLAND (32K) Coco, disk only. Your plane has crashed on a deserted island and you must use all of your wits to stay alive. Beautiful half-screen picture graphics take you through jungle and beach in this fun-filled machine language adventure. Comes on two disks. **$23.00**

Disk only! SAGA-THE SORCERER'S CURSE 32K 100% hi-res, 100% ML graphic adventure. Fantastic!—$22

Disk only! REDSTAR 32K 100% hi-res 100% ML. Futuristic wargame involving NATO and the WARSAW PACT.— $25

BARBAROSSA 64K 100% hi-res 100% ML game of the war in Russia 1941-1944. "A Blockbuster," says Hot Coco's Peter Paplaskas. Reviewed Jan. '86 Hot Coco.—$25 (Tandy 1000)

D-DAY Our second 64K 100% hi-res 100% ML, this one dealing with the Allies invasion of France in 1944. Massive! No review date set yet.— $25

PHALANX 32K 100% hi-res, 100% ML game of Alexander the Great. No review date set yet.— $15

COMPANY COMMANDER 32K ML routines. Tactical squad level wargame set in WWII. 12 scenarios, add-on expansion modules. Dec. '85 Rainbow.—$23 disk or tape

RIVER CROSSING 32K ML routines. A Company Commander add-on module, but you no longer need C/C to play it.—$23

CINCPAC BATTLE OF MIDWAY 32K 100% hi-res 75% ML. The battle that turned the tide of war. Aug. '85 Rainbow.— $23

ESCAPE FROM DENNA 32K ML routines. Semigraphic Dungeon adventure game. No review date set yet.— $15

BATTLE OF THE BULGE 32K Semigraphic wargame. 1 or 2 players. Aug. '85 Rainbow.—$15

BATTLE FOR TUNIS 32K Semigraphic wargame. 1 or 2 players. Sept. '85 Rainbow.—$15

ACROSS THE RUBICON 32K Semigraphic wargame. Feb. '84 Rainbow.— $18

WATERLOO 32K ML routines. Semigraphic wargame. Mar. '84 Rainbow.—$15

KAMIKAZE 32K Hi-res graphic wargame. Apr. '83 Rainbow.—$15

BOMBER COMMAND 32K disk, 16K tape. Semigraphic wargame. ML routines. Jan. '84 Rainbow.—$10

GUADALCANAL 32K Semigraphic wargame. ML routines.— $15

ARK ROYAL GAMES

Prices on all programs include shipping to U.S., APO's, Canada. COD's (USA only) add 3.50. Florida Residents add 5%. All Orders shipped within 24 hours. Programs require Color Computer TM (Tandy Corp.) or TDP System 100 Computer TM (RCA). Many programs soon to be available on MS-DOS systems.

P. O. Box 14806
Jacksonville, FL 32238
(904) 786-8603

Other staff members have worked very hard in setting up some special programs for RAINBOWfest, too. This should be one of our most dynamic shows.

The highlight of the general program will be a round table discussion on the new CoCo 3 featuring four people you will probably never see again on the same stage. Barry Thompson, the CoCo line manager for Tandy, and Mark Siegel, who's in charge of software development, will be joined by two third-party CoCo programmers: Greg Zumwalt and Steve Bjork. Greg and Steve had stories in last month's special issue.

While this is a round table, there will also be plenty of time for questions and answers. It is really going to be *the* session to attend — and we've set a special time so that all the exhibitors and people working the show will be able to be there, too. Plan to attend this one!

Zumwalt is our speaker at the CoCo Community Breakfast Saturday morning, and I think Greg's talk will be a tour de force you will not want to miss! I know few actually have a CoCo 3 in hand at this time, but I am certain you will be impressed with Greg's windowing demonstration. Expect more good things from him (at RAINBOWfest and in the pages of THE RAINBOW) in the future.

Siegel and Bjork are also giving separate seminars, as will a host of other people, including our own Dale Puckett, Brian Lantz, Bill Turner and George Dorner from the OS-9 Users Group. And, we'll have the great Bill Barden, ever-popular Fred Scerbo and a bunch of others, too. I think it is the best seminar lineup we've ever had.

Why, there's even a new T-shirt design for the show! Be there. I know I will.

Yes, there is a CoCo 3 at THE RAINBOW. (Interesting how many people have asked me.) The biggest difficulty has been in keeping people away from it so we can get a few things together for this and subsequent issues. The more I see of it, the better I like it. Messrs. Thompson, Siegel and all have done a truly superb job on this machine. I find myself sneaking in at night just to play with it a little more.

What impresses me most about the CoCo 3 is how much it changes so many of the things we have been doing for years. The addition of the 80-character screen width, the colors available for characters and background, and the underline and blinking attributes mean vastly superior displays with programming ease. I've never been able to draw particularly well, but it is easy to see what vast potential the increased resolution and colors will have on almost anything.

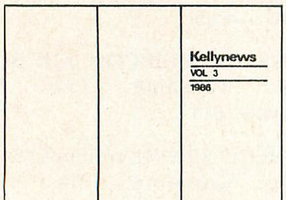
And these things are available in plain ol' ordinary BASIC. When you get into the many other things CoCo 3 can do, there is an almost unlimited resource available to us again.

I know most of us looked at Ataris and Amigas and wondered what the CoCo 3 would offer and when. We had the best computer for a long, long time. When you've been on top of the heap, you want to be there some more. It's nice to be better again.

— Lonnie Falk

Canadians!
We are Canada's largest distributor of Color Computer products.

Send for your free copy of our 1986 Catalog

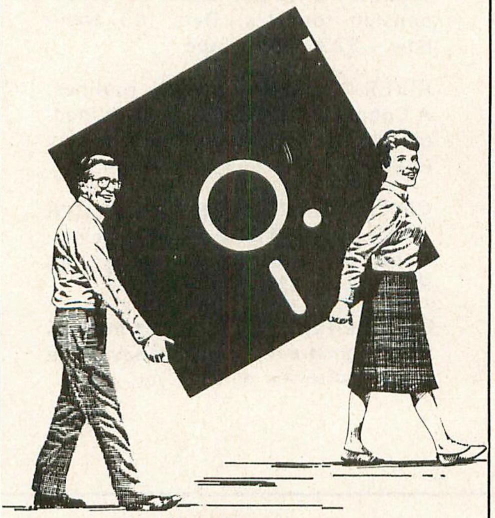

Kellynews
VOL 3
1986
KELLY SOFTWARE DISTRIBUTORS LIMITED
SOFTWARE FOR THE COLOR COMPUTER

Kellynews-3 is now available and contains news, hints, programs and articles from the crew of Kelly Software.

Please note our new phone number.

Phone: (403) 236-2161

We have moved to our new location.



Kelly Software Distributors Ltd.
P.O. Box 608,
Station 'T' Calgary
Alberta T5H 2H2

Call now . . .

(403) 236-2161

Call our orderline for quick delivery.

We accept phone orders on your VISA or Master Card. No C.O.D.

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on the table of contents and at the beginning of articles indicates that the program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

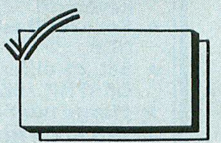
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS,* type in the program and `CSAVE` it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down-arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so you can operate them.

The easiest way is by using an editor/assembler, a program you can purchase from a number of sources.

An editor/assembler allows you to enter mnemonics into the CoCo and then have the editor/assembler assemble them into specific instructions that are understood by the 6809 chip, which controls your computer.

When using an editor/assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand-assemble some programs.

Use the following program if you wish to hand-assemble machine language listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has been physically seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

BUILDING OCTOBER'S RAINBOW

Introducing Rainbow On Disk . . .
. . . with a "hitch" to it!

We would like to remember this as the month we phased in our new RAINBOW ON DISK service with only one hitch. Knock on wood. Yes, beginning with this issue of THE RAINBOW, you can have your choice of RAINBOW ON TAPE or our new RAINBOW ON DISK! With the advent of the CoCo 3 and the new emphasis on OS-9, the time has come to offer a vehicle for OS-9 programs, which, of course, have been unavailable on our tape service.

Enter RAINBOW ON DISK, formatted for both Disk Extended BASIC and the OS-9 operating systems! Yes, both. Thanks to a "flippy," a double-sided disk for single-sided disk drives, we have Disk Extended BASIC on one side of the disk and OS-9 on the other. In fact, because one side of the disk may not always hold all of our Color BASIC, Extended Color BASIC and Disk Extended BASIC material, some months only a portion of a side will be formatted for OS-9 and the rest of that same side formatted to hold the spillover of other programs.

Actually, it isn't that complex to create the disk itself, and we do have experience producing disk services for RAINBOW's sister publications, but we are a bit anxious as to how RAINBOW ON DISK users will receive this newest offering. Therefore, we solicit your comments and suggestions. We fully expect RAINBOW ON DISK to undergo an evolution over the next few months as we get your feedback and incorporate your ideas for improving it.

Certainly, we expect that most of you will use this new service with no problems; but it is almost as certain, given the many systems and configurations and varying levels of expertise among RAINBOW readers, that we will not have anticipated every contingency. For instance, did I tell you about the guy who found it convenient to keep disks on the outside of his filing cabinet — using a refrigerator *magnet* to hold them in place? That's a "don't" we had not even considered!

So, away we go with RAINBOW ON DISK! RAINBOW Contributing Editor Fred Scerbo did the colorful opening graphics. Dan Downard decided on the "flippy" and the formatting arrangement. Kevin Nickols is writing the documentation. Newly-arrived artist Denise Webb is doing the graphic design. Cray Augsburg is creating each month's master disk. And Jutta Kapfhammer is pulling together all the pieces of the package.

Yet, the work of producing this new product only begins there. Others, such as Mark Herndon and Janice Eastburn are involved in the mass-producing and distribution. We expect Fulfillment Services Director Bonnie Frowenfeld and business department staffers Sandy Apple, Monica Wheat, Beverly Bearden, Pat Eaton and Sharon Smith to have their hands full starting new subscriptions, prorating changeover fees and all. Then, there's advertising and promotion. Bookkeeping. Editorial. Typesetting. You get the picture; it involves just about the entire staff here — and, we hope it will involve you, too!

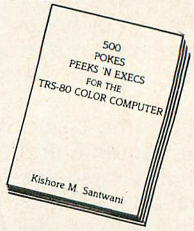
To encourage you to become a charter subscriber to RAINBOW ON DISK, right off the bat we're discounting the price of a year's subscription. While the full nitty-gritty details are in our ad on Page 80, this means, for instance, that the basic U.S. rate of $99 for a year's subscription to RAINBOW ON DISK is being dropped to only $90 during this introductory offer period — that's only a little more than a tape subscription, and, during the course of a year, a savings of $54 over the monthly $12 single-issue price! Present tape subscribers can change their subscriptions over to disk service, too; details were put inside the tape package when the September issue was shipped.

A final tip: For additional savings on credit card orders, call us toll free at (800) 847-0309 to begin receiving RAINBOW ON DISK with the very first issue. A yearly subscription to RAINBOW ON DISK — we believe you'll enjoy signing up for a full 12-month "hitch."

— Jim Reed

500 POKEs, PEEKs, 'N EXECs

FOR THE TRS-80 COCO



NEVER BEFORE has this information of vital significance to a programmer been so readily available to everyone. This book will help you 'GET UNDERNEATH THE COVER' of the Color Computer and develop your own HI-QUALITY Basic and ML programs. SO WHY WAIT??

This 80-page book includes POKEs, PEEKs and EXECs to:

- ★ **Autostart** your basic programs
- ★ **Disable** Color Basic/ECB/Disk Basic commands like LIST, LLIST, POKE, EXEC, CSAVE(M), DEL, EDIT, TRON, TROFF, PCLEAR, DLOAD, RENUM, PRINT USING, DIR, KILL, SAVE, LOAD, MERGE, RENAME, DSKINI, BACKUP, DSKI$, and DSKO$.
- ★ **Disable** BREAK KEY, CLEAR KEY and RESET BUTTON.
- ★ **Generate** a Repeat-key.
- ★ **Transfer** ROMPAKS to tape (For 64K only).
- ★ **Speed Up** your programs.
- ★ **Reset**, MOTOR ON/OFF from keyboard.
- ★ **Recover** Basic programs lost by NEW.
- ★ **Set 23** different GRAPHIC/SEMIGRAPHIC modes
- ★ **Merge** two Basic programs.
- ★ **AND MUCH MUCH MORE!!!**

COMMANDS COMPATIBLE WITH 16K/32K/64K/COLOR BASIC/ECB/DISK BASIC SYSTEMS and CoCo I and CoCo II.

ONLY $16.95

ORDER TODAY! VISA, MC, Am Ex, Check or MO. COD add $2.50. Please add $3.00 S & H (USA & Canada, foreign add $5.00). NYS residents pl. add sales tax. All orders shipped WITHIN 24 HOURS!!!

MICROCOM
SOFTWARE
P.O. Box 214 Fairport, N.Y. 14450
Phone (716) 223-1477

UTILITIES/BOOKS

UTILITY ROUTINES for the TANDY & TRS-80 COCO (Vol 1)

This powerful book for Basic and ML Programmers, includes program explanation, memory requirements and an annotated source listing for the utility routines given below. These routines if bought individually will cost you HUNDREDS OF DOLLARS.

These are 100% Position Independent ML Utilities and require no ML programming knowledge.

COMMAND KEYS: Access commands with 2 keystrokes.
CURSOR STYLES: Over 65000 cursor styles.
ERROR SKIP: 'ONERR GOTO' for Basic Programs.
FULL LENGTH ERRORS: Get real word error messages.
KEY CLICKER: Ensure key input accuracy.
REPEAT KEY: Repeat ANY key.
REVERSE VIDEO (Green & Red): Eliminate eye-strain.
SPOOLER: Don't wait for those long printouts.
SUPER SCROLLER: Save/view scrolled lines.
TAPE-TO-DISK: Copy Basic and ML programs.
AND MUCH MUCH MORE!!!

For 16K/32K/64K Cassette or Disk Systems, CoCo I & CoCo II.

BOOK $19.95

THESE ROUTINES (READY-TO-RUN) ON CAS/DISK:

$24.95

BOTH BOOK AND CASSETTE or DISK:

$36.95

OTHER "MUST" BOOKS

UNRAVELLED SERIES: These 3 books provide a complete annotated listing of the BASIC/ECB and DISK ROMs.

COLOR BASIC UNRAVELLED: $19.95
EXTENDED BASIC UNRAVELLED: $19.95
DISK BASIC UNRAVELLED: $19.95
ALL 3 UNRAVELLED BOOKS: $49.95
RAINBOW GUIDE TO OS-9 (Book): $18.95
RAINBOW GUIDE TO OS-9 (2 Disks): $29.00
BASIC PROGRAMMING TRICKS: Tips and tricks for Basic Programmers. Only **$14.95**

WE HAVE ALL THAT YOU NEED TO SUCCEED

SUPER TAPE/DISK TRANSFER

- Disk-to-Disk Copy (1 – 3 passes)
- Tape-to-Disk Copy
- Tape-to-Disk Automatic Relocate
- Disk-to-Tape Copy
- Tape-to-Tape Copy

Copies Basic/ML programs and DATA files.
32K Disk System
(Disk to Disk Copy requires 64K)
DISK ONLY **$24.95**

NEW!

SUPPLEMENT to 500 POKES, PEEKS 'N EXECS

ONLY **$9.95**

200 additional Pokes, Peeks 'n Execs to give you MORE PROGRAMMING POWER. Includes commands for:

- **Rompak Transfer to disk**
- **PAINT with 65000 styles!**
- **Use of 40 track single/double sided drives with variable step-rates**
- **High-Speed Cassette Operation**
- **Telewriter 64®, Edtasm+® and CoCo Max® Enhancements**
- **Graphics Dump (for DMP printers) & Text Screen Dump**
- **AND MUCH MUCH MORE!**
- **500 POKES, PEEKS 'N EXECS is a prerequisite**

UTILITY BONANZA I

Includes 20 best-selected utilities:

- **40K Disk Basic**
- **Disk Cataloger**
- **Super Tape-to-Disk Copy (with Automatic Relocate)**
- **Disk-to-Tape Copy**
- **LList Enhancer (with page numbering!)**
- **Graphics Typesetter (two text sizes!)**
- **LARGE DMP Graphics Dump**
- **X-Ref for Basic Programs**
- **Hidden 32K (Use the "hidden" 32K from your 64K CoCo)**
- **Basic Stepper (Super Debugger!)**
- **RAM Disk (for Cassette & Disk Users)**
- **Single Key Printer Text Screen Dump**

AND MUCH, MUCH MORE!!!

DISK (64K Req.) ONLY **$29.95**

OTHER SOFTWARE...

Telewriter-64 (Cas) **$47.95** (Dsk)	**57.95**
Teleform: Mail Merge for TW-64®	**19.95**
Telepatch (Dsk)	**19.95**
CoCo Max (Cas)	**67.95**
CoCo Max II (Dsk)	**77.95**
CoCo Max Upgrade (Dsk)	**18.95**
Pro Color File (Dsk) (includes SIMON)	**54.95**
Dynacalc (Dsk)	**79.95**
Autoterm (Cas)	**36.95**
(Latest Version) (Dsk)	**46.95**

COCO UTIL II (Latest Version): Transfer CoCo Disk files to IBM compatible computer. Transfer MS-DOS files to CoCo. ONLY **$36.95**

DISK ANTI-PIRATE: Best copy-protection program for disk Basic and ML programs. ONLY **$59.95.**

HIDE-A-BASIC 1.1: Best copy-protection program for Cassette Basic programs. ONLY **$24.95.**

(Both Disk Anti-Pirate & Hide-A-Basic 1.1 for ONLY **$79.95)**

CABLES/HARDWARE

UNIVERSAL VIDEO DRIVER: Use your monochrome or color monitor with your CoCo (ALL CoCos). Includes audio connection. Easy installation – no soldering. ONLY **$29.95**

INTRONICS EPROM PROGRAMMER: Best EPROM Programmer for the CoCo. Lowest Price Anywhere – **$137.95.**

RS232 Y CABLE: Hook 2 devices to the serial port. ONLY **$18.95.**

MICROCOM 2 POSITION SWITCHER: Select any one of two RS232 devices (printers/modems) from the serial port. ONLY **$29.95.**

MICROCOM 3 POSITION SWITCHER: Select any one of three RS232 devices (printers/modems) from the serial port. ONLY **$34.95.**

Y CABLE: Use your Disk System with CoCo Max, DS69, etc. ONLY **$24.95.**

DISKETTES (10): BONUS Brand SS/DD diskettes for the CoCo. 100% Guaranteed. **$12/box.**

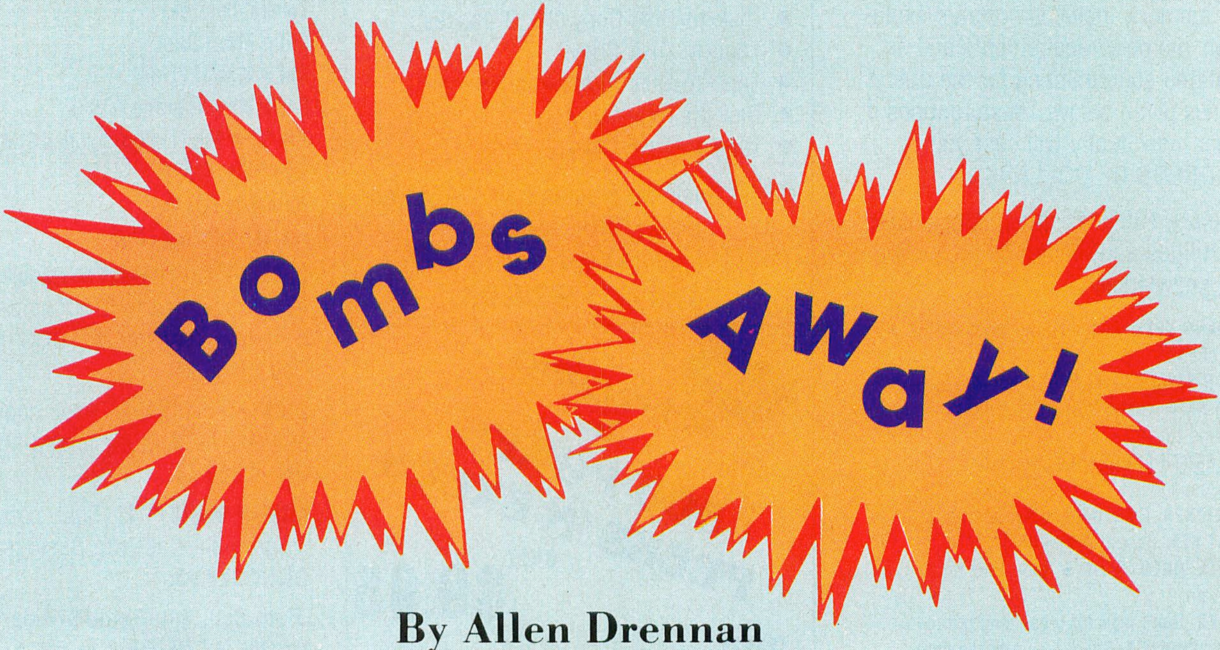
MJP MICROCOM SOFTWARE
P.O. Box 214
Fairport, N.Y. 14450
Phone (716) 223-1477

Our software/books are available at all leading dealers in USA, Canada and Australia. To Order: **Order by phone & get a $2 refund for your phone call.** VISA, MC, Am Ex, Check, M.O. Please add $3.00 shipping and handling (USA & CANADA, other countries $5.00). COD add $2.50 extra. NYS residents please add Sales Tax. Immediate shipment. Dealer inquiries invited.

MasterCard AMERICAN EXPRESS VISA

24-HOUR ORDER HOT LINE (7 DAYS A WEEK): (716) 223-1477

Skill and a keen intellect are needed to win in combat . . . but an over-eager trigger finger works against you.



Bombs Away!

By Allen Drennan

Bombs Away is a nuclear war between two opponents. Both sides fire missiles in an attempt to destroy each other.

Each player takes his turn by typing the angle (0-90) followed by a comma and the velocity. But be warned: If the velocity is too great, your base falls apart from the stress. If the velocity is too little, the missile blows up your base. A range of zero to 200 works best. Some experimentation is required to determine the best velocity for your computer. As you fire, remember to compensate for wind and terrain.

To win the battle, you must destroy the opponent's base. A game is won when a certain number of battles have been fought. The number of battles to be played is determined at the beginning of the game. The computer keeps score and reports it to the players at the beginning of each battle.

The game is simple to use and the prompts are all user friendly. ENTER is used as a toggle switch to go from the text screen to the graphics screen and back again during a player's turn. *Bombs Away* is written in Extended Color BASIC as a high resolution game. It should run in 16K with no modifications. □

(Questions about this program may be directed to the author at 19506-D Industrial Drive, Sonora, CA 95370, 209-533-8489. Please enclose an SASE when writing.)

Allen Drennan has been programming in many languages for seven years. He is currently a junior at Sonora High School in Sonora, California. He programs games and software for himself.

The Ultimate Color Computer

Enhancements for Productivity from HJL Products

HJL
PRODUCTS
Div. of Touchstone Technology Inc.
GoldStar
12" MONOCHROME
Quick Basic Plus
USER'S GUIDE
NUMBERJACK
The HJL Numeric Keypad
SPACE BAR

To achieve maximum productivity with your Color Computer, you have to make it as easy as possible to get information into and out of the system.

This is why we developed the HJL family of high-performance enhancements for ALL MODELS of the Color Computer.

The Keyboard - $79.95
The overwhelming favorite of serious Color Computer users worldwide, the HJL-57 keyboard has the smooth, consistent feel and reliability you need for maximum speed with minimum input errors. Includes 4 Function Keys and sample function key program. Installs in just a few minutes with no soldering.

The Numeric Keypad - $89.95
The NumberJack is a self-contained, cable-connected keypad for heavy-duty number-crunchers. Besides the number keys, it has all the cursors, symbols and math keys, including autoshifted (one-touch) ADD and MULTIPLY. Comes complete with 3-foot cable and all necessary connectors for quick and easy installation without soldering.

The Monitor Adapter - $25.95
This universal driver works with all monochrome monitors, and is easily installed without clips, jumpers or soldering (except in some later CoCo 2s with soldered-in video chips). Here's crisp, clear, flicker-free monitor output with all the reliability you've come to expect from HJL Products.

The Monitor - $89.95
The GoldStar high-resolution amber monitor brings you the monochrome display that's preferred by most computer professionals today. Once you've used it you'll never connect your computer to a TV set again. The 12-inch diagonal CRT has an etched non-glare faceplate. (Requires adapter sold below)

The BASIC Utility - $25.95
Quick Basic Plus, a high-performance programming utility, can be used with any color computer that has four function keys. 26 pre-defined BASIC statements, 10 user-defined macros at a time (you can save as many sets of macros as you like), automatic line-numbering, word wrap, global search, and instant screen dump to printer, make this software the BASIC programmer's dream come true. Comes with re-legendable 3-way reference chart. Specify disk or cassette.

The HJL Warranty
Every HJL product comes with a full, one-year warranty and the exclusive HJL 15-day unconditional guarantee (except software).

Pick a Pair & Save 15%
Now, for a limited time, we'll give you 15% off the price of any two or more products shown here. Just mention this ad when you order.

Call Now, Toll Free

1-800-828-6968

In New York 1-800-462-4891
International calls: 716-235-8358

HJL
PRODUCTS
Div. of Touchstone Technology Inc.

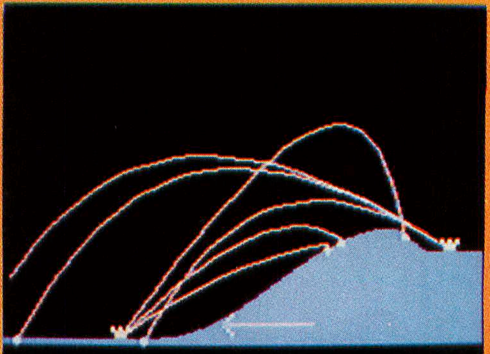
955 Buffalo Road • P.O. Box 24954
Rochester, New York 14624

Ordering Information: Specify model (Original, F-version, or CoCo 2 Model Number). Payment by C.O.D., check, MasterCard, or Visa. Credit card customers include complete card number and expiration date. Add $2.00 for shipping, 3.50 to Canada; except monitors (call for shipping charges before ordering monitors). New York state residents add 7% sales tax. **Dealer Inquiries Invited**

270	20
470	165
620	22
900	1
1090	140
1260	105
1410	204
1580	140
END	108

The listing: BOMBAWAY

```
100 ' BOMBS AWAY
110 '
120 ' ALLEN DRENNAN
130 ' 1986 COLOR CLOUD
140 ' 19506-D INDUSTRIAL DR.
150 ' SONORA, CA. 95370
160 ' (209) 533-3477
170 '
180 DIM H(139):GOTO 1320
190 SCREEN 1,1:FOR I=1 TO 254 ST
EP 2:LINE(I,(H(I/2)+1))-(I,159),
PSET:NEXT
200 RETURN
210 REM
220 REM ** CREATE BASES
230 REM
240 CLS:PCLS:PRINT:PRINT:PRINT:P
RINT:PRINT:PRINT:PRINT"    NUCLE
AR BASES ACTIVE ...":N1=2:FOR I=
1 TO 1000:NEXT I:CLS
250 PMODE 4,1:SCREEN 1,1:PCLS:SC
REEN 1,1:PCLS
260 X1=20+FND(30):X2=80+FND(40):
L(1)=10+FND(X1-10):L(2)=X2+FN D(
120-X2)
270 N=158-FND(58):FOR I=0 TO X1:
H(I)=N:NEXT:N=1:GOSUB 1190
280 N=158-FND(58):FOR I=X2 TO 13
9:H(I)=N:NEXT:N=2:GOSUB 1190
290 FOR KK=1 TO 1000:NEXT KK
300 X3=X1+FND(X2-X1-20)+10:H(X3)
=50+FND(100):N=H(X3)/2:D1=N-H(1)
/2:D2=N-H(139)/2
310 REM
320 REM ** SCOREBOARD
330 REM
340 CLS:PRINT:PRINT"THE SCORE:
";P$(1);:PRINT" =";S(1):PRINT "
          ";P$(2);:PRINT" =";S(
2)
350 IF S(1)+S(2)=0 THEN 390
360 REM
370 REM ** CREATE ILLUSION
380 REM
390 A=180:R=180/(X3-X1+1):N=H(1)
+D1
400 FOR I=X1+1 TO X3-1:A=A-R:H(I
)=COS(A*.0174533)*D1+N:NEXT
410 A=0:R=180/(X2-X3+1):N=H(139)
+D2
420 FOR I=X3+1 TO X2-1:A=A+R:H(I
)=COS(A*.0174533)*D2+N:NEXT
430 CLS:GOSUB 190
440 REM
450 REM ** DISPLAY WIND FACTOR
460 REM
470 W=FND(100)-50:PRINT:PRINT:PR
INT:PRINT:PRINT:PRINT "  WIND FA
CTOR";:IF W<=0 THEN PRINT W+(W*-
2);"TO THE WEST." ELSE PRINT W;"
TO THE EAST."
480 FOR I=1 TO 1500:NEXT I:CLS:G
OSUB 1230:N=N1
490 N=3-N:S=5*N-4
500 REM
510 REM ** PLAYER PROFILE
520 REM
530 CLS:PRINT "LAST SHOTS :";:FO
R I=0 TO 3:PRINT A(S+4-I);:NEXT:
PRINT
540 PRINT"               ";:FOR I=0
 TO 3:PRINT V(S+4-I);:NEXT I:PRI
NT
550 PRINT "FIRING :";
560 IF N=1 THEN PRINT "LEFT" ELS
E PRINT "RIGHT"
570 PRINT "WIND FACTOR";
580 IF W<=0 THEN PRINT W+(W*-2);
"TO THE WEST." ELSE PRINT W;"TO
THE EAST."
590 ANG$="":V$="":PRINT P$(N);
600 LINE INPUT " CALL YOUR SHOT
";YU$:IF YU$="" THEN 690
610 FOR I=1 TO LEN(YU$):IF MID$(
```



```
YU$,I,1)="," THEN 640
620 ANG$=ANG$+(MID$(YU$,I,1))
630 NEXT I
640 FOR I=I+1 TO LEN(YU$):V$=V$+
(MID$(YU$,I,1)):NEXT I
650 ANG=VAL(ANG$):V=VAL(V$):GOTO
 740
660 REM
670 REM ** PERFORM TOGGLE
680 REM
690 SCREEN 1,1
700 A$=INKEY$:IF A$=""THEN 730
710 IF A$=CHR$(13) THEN 530
720 GOTO 700
730 GOTO 700
740 CLS:SCREEN 1,1
750 IF V<350 THEN 790
760 PRINT:PRINT"YOUR BASE BLEW A
PART FROM TO     MUCH PRESSURE AN
D FORCE.":FOR I=1 TO 1500:NEXT I
770 FOR I=1 TO 1000:NEXT I
780 GOTO 1120
790 GOSUB 1220
800 REM
810 REM ** FIRE MISSLE
820 REM
830 IF N=2 THEN ANG=180-ANG
840 V1=COS(ANG*.0174533)*V:V2=-S
IN(ANG*.0174533)*V
850 MN=L(N):X=L(N)*2:Y=H(MN)
860 IF N=1 THEN X=X+1 ELSE X=X-6
870 X=X-7*(N=2)
880 PSET(X,Y,3):OX=0
890 XO=X:YO=Y
900 X=X+V1/10:V1=V1+(W-V1)/30:IF
 X<0 OR X>254 THEN 490
910 Y=Y+V2/10:V2=V2+6
920 IF Y<1 THEN 960
930 IF OX THEN PSET(OX,0,3):OX=0
940 PLAY"T255;O1;1;1"
950 LINE(XO,YO)-(X,Y),PSET:XO=X:
YO=Y:GOTO 970
960 OX=X
970 IF H(X/2)-Y>2 THEN 900
980 Y=H(X/2)+2
990 PSET(X,Y,3)
1000 IF ABS(X/2-L(3-N))<3 THEN 1
080
1010 IF ABS(X/2-L(N))>3 THEN 107
0
1020 PRINT:PRINT " YOU DESTROYED
 YOURSELF ";P$(N):FOR I=1 TO 150
0:NEXT I:GOSUB 1720
1030 GOTO 1120
1040 REM
1050 REM ** SOUND EFFECTS
1060 REM
1070 PLAY"T200;O1;V31;8;8;8;V25;
6;6;6;V20;4;4;4;V15;2;2;2;V10;1;
1;1":CIRCLE(X,Y),2,3:GOTO 490
1080 PLAY"O1;T255;V10;4;4;4;V15;
6;6;6;V20;8;8;8;V25;10;10;10;V31
;12;12;12;V25;10;V20;8;V15;6;V10
;4":GOSUB 1720
1090 WIN=N
1100 FOR KK=1 TO 1000:NEXT KK
1110 N=3-N
1120 S(3-N)=S(3-N)+1:IF S(3-N)+S
(N)=GN THEN 1580
1130 FOR I=1 TO 10:A(I)=0:V(I)=0
:NEXT:N1=3-N1:PCLS:GOTO 260
1140 GOTO 1580
1150 END
1160 REM
1170 REM ** DRAW BASES
1180 REM
1190 X=L(N)*2:Y=H(L(N))-1:FOR I=
-2 TO 3:LINE(X+I,Y+1)-(X+I,Y-2),
PSET:NEXT
1200 LINE(X-4,Y-4)-(X-4,Y-2),PSE
T:LINE(X-3,Y-4)-(X-3,Y-2),PSET:L
INE(X,Y-4)-(X,Y-2),PSET:LINE(X+1
,Y-4)-(X+1,Y-2),PSET
1210 LINE(X+4,Y-4)-(X+4,Y-2),PSE
T:LINE(X+5,Y-4)-(X+5,Y-2),PSET:R
```

ARTIFICIAL INTELLIGENCE
FOR YOUR COCO

RAINBOW CERTIFICATION SEAL

THREE GREAT PROGRAMS —

1. CoCo EXPERT — INCREASE YOUR HAPPINESS
2. CoCo THERAPIST — DISCUSS YOUR PROBLEMS
3. CoCo POET — ENDLESS STIMULATING POETRY

COMPLETE DOCUMENTATION INCLUDES
"THE HISTORY OF AI"

ALL JUST $34.95 (SPECIFY TAPE OR DISK)

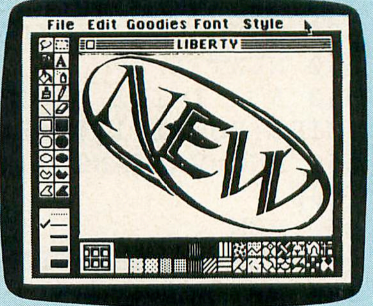
Now Available —
COCO EXPERT SYSTEM TOOLKIT

BUILD YOUR OWN EXPERT SYSTEM
USING SIMPLE MENU COMMANDS.
— INCLUDES SHELL, TOOLKIT, DEMO
AND TUTORIAL
— CREATE YOUR OWN KNOWLEDGEBASE
— $79.95 * DISK ONLY * 64K REQUIRED

TSI

THINKING SOFTWARE, INC.
46-16 65 PLACE
WOODSIDE, N.Y. 11377
(718) 429-4922

CoCo Max™ II



You'll use it all the time and love using it.

What is CoCo Max?

Simply the most incredible graphic and text creation "system" you have ever seen. A Hi-Res Input Pack (more on the pack later) is combined with high speed machine language software. The result will dazzle you.

CoCo Max
CoCo Max
CoCo Max II

CoCo Max disk system, with Y-cable.

Is CoCo Max for you?

Anyone who has ever held a pencil or a crayon for fun, school or business will love it. A 4 year-old will have fun doodling, a 15 year-old will do class projects and adults will play with it for hours before starting useful applications (illustrations, cards, artwork, business graphics, flyers, charts, memos, etc.) This is one of the rare packages that will be enjoyed by the whole family.

What made CoCo Max an instant success?

First there's nothing to learn, no syntax to worry about. Even a child who can't read will enjoy CoCo Max. Its power can be unleashed by simply ***pointing*** and ***clicking*** with your mouse or joystick. With ***icons*** and ***pull down menus,*** you control CoCo Max intuitively; it works the same way you think.

Don't be misled by this apparent simplicity. CoCo Max has more power than you thought possible. Its blinding speed will astound you.

It lets you work on an area 3.5 times the size of the window on the screen. It's so friendly that you will easily recover from mistakes: The ***undo*** feature lets you revert to your image prior to the mistake. As usual, it only takes a single click.

Later, we will tell you about the "typesetting" capabilities of CoCo Max II, but first let's glance at a few of its graphic creation tools:

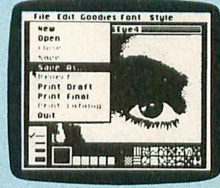
With the ***pencil*** you can draw free hand lines, then use the ***eraser*** to make corrections or changes. For straight lines, the convenient ***rubberbanding*** lets you preview your lines before they are fixed on your picture. It's fun and accurate. Lines can be of any width and made of any color or texture.

The ***paint brush,*** with its 32 selectable brush shapes, will adapt to any job, and make complicated graphics or calligraphy simple.

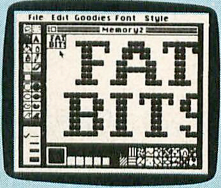
For special effects, the ***spray can*** is really fun: 86 standard colors and textures, all available at a click. It's like the real thing except the paint doesn't drip.

CoCo Max will instantly create many shapes: circles, squares, rectangles (with or without rounded corners), ellipses, etc. Shapes can be filled with any pattern. You can also add hundreds of custom patterns to the 86 which are included.

The ***Glyphics*** are 58 small drawings (symbols, faces, etc.) that can be used as rubber stamps. They're really great for enhancing your work without effort.



Pull down menus



Zoom in!

Control Over Your Work

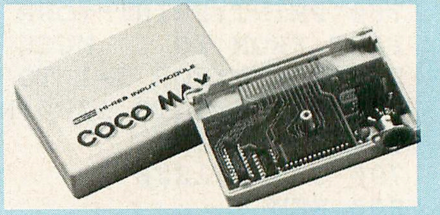
CoCo Max's advanced "tools" let you take any part of the screen, (text or picture) and perform many feats: • You can move it around • Copy it • Shrink or enlarge it in both directions • Save it on the electronic ***Clipbook*** • Flip it vertically or horizontally • Rotate it • Invert it • Clear it, etc. etc.

All this is done instantly, and you can always ***undo*** it if you don't like the results.

For detail work, the ***fat bits*** (zoom) feature is great, giving you easy control over each pixel.

To top it all, CoCo Max II works in color. Imagine the pictures in this ad in color. If you own a Radio Shack CGP-220 or CGP-115, you can even print your work in full color!

There is so much more to say, such as the capability to use CoCo Max images with your BASIC programs, the possibility to use CoCo Max's magic on any standard binary image file. There are also many advanced features such as the incredible ***lasso***.



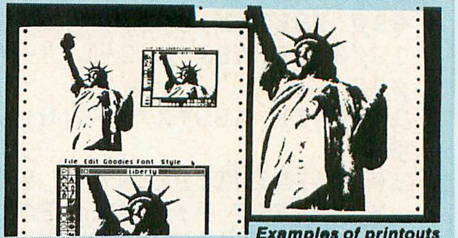
Inside the Hi-Res Input Pack

Why a Hi-Res Input Pack?

Did you know that the CoCo joystick input port can only access 4096 positions (64x64)? That's less than 10% of the Hi-Res screen, which has 49152 points! (256x192). You lose 90% of the potential. The Hi-Res Input Pack distinguishes each of the 49152 distinct joystick or mouse positions. That's the key to CoCo Max's power. The pack plugs into the rom slot (like a rom cartridge). Inside the pack is a high speed multichannel analog to digital converter. Your existing joystick or mouse simply plugs into the back of the Hi-Res Pack.

Electronic Typesetting...

You'll be impressed with CoCo Max's capability. Text can be added and moved around anywhere on the picture. (You can also rotate, invert and flip it...) At a click, you can choose from 14 built in ***fonts*** each with 16 variations. That's over 200 typestyles!


File Edit Goodies Font Style
Liberty

Examples of printouts

Printing Your Creations

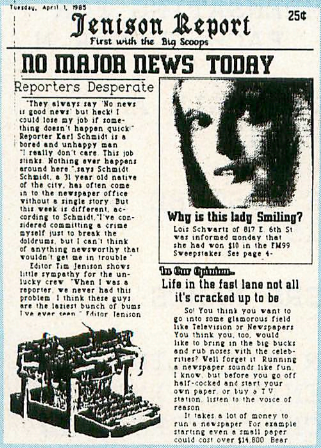
There are a dozen ways to print your work. All are available with a click of your joystick (or mouse) without exiting CoCo Max. Your CoCo Max disk includes drivers for over 30 printers!

All the CoCo Max pictures are **unretouched** screen shots or printouts (Epson RX-80).

CoCo Max II™

The whole family will enjoy CoCo Max. Here are a few examples of the possibilities.

All these pictures are **unretouched** screen photos or printouts (on an Epson RX-80).



Tuesday, April 1, 1985

Jenison Report 25¢

First with the Big Scoops

NO MAJOR NEWS TODAY

Reporters Desperate

"They always say 'No news is good news' but heck! I could lose my job if something doesn't happen quick!" Reporter Karl Schmidt is a bored and unhappy man. "I really don't care. This job stinks. Nothing ever happens around here." says Schmidt. Schmidt, a 31 year old native of the city, has often come in to the newspaper office without a single story. But this week is different, according to Schmidt. "I've considered committing a crime myself just to break the doldrums, but I can't think of anything newsworthy that wouldn't get me in trouble."

Editor Tim Jenison shows little sympathy for the unlucky crew. "When I was a reporter, we never had this problem. I think these guys are the laziest bunch of bums I've ever seen." Editor Jenison

Why is this lady Smiling?

Lois Schwartz of 817 E. 6th St was informed monday that she had won $10 in the FM99 Sweepstakes. See page 4-

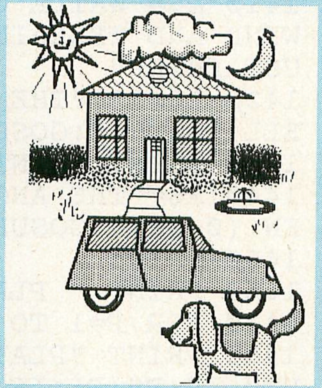
In Our Opinion...

Life in the fast lane not all it's cracked up to be

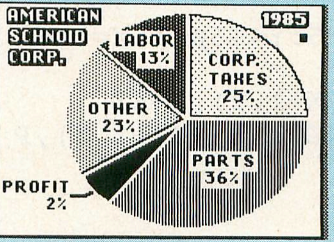
So! You think you want to go into some glamorous field like Television or Newspapers. You think you, too, would like to bring in the big bucks and rub noses with the celebrities? Well forget it. Running a newspaper sounds like fun, I know, but before you go off half-cocked and start your own paper, or buy a T.V. station, listen to the voice of reason.

It takes a lot of money to run a newspaper. For example starting even a small paper could cost over $14,800. Bear

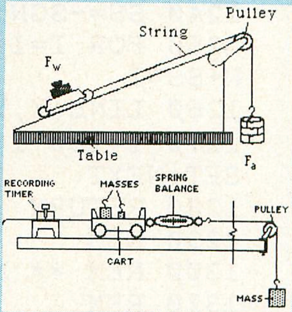
① *Publish a newsletter or bulletin*



② *Fun for children while stimulating creativity.*



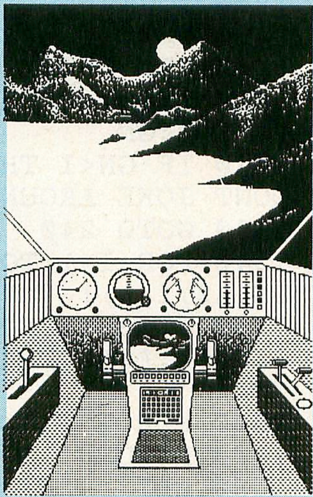
③ *Business graphs, charts, diagrams. Also memos*



④ *Junior's homework and science projects. Term papers too!*

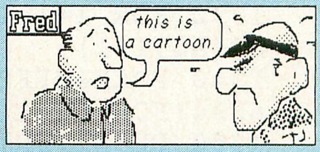
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max
CoCo Max

⑤ *Over 200 typestyles to choose from! generate flyers.*

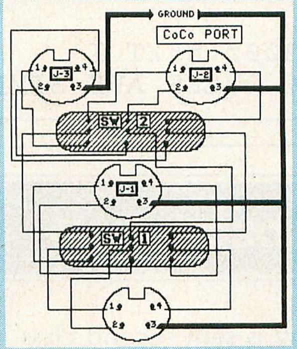


⑥ *A new way to express your imagination.*

⑦ *Video portrait (with optional digitizer).*



⑧ *This is a cartoon.*



⑨ *schematics and floor plans.*

CoCo Max II
CoCo Max II
CoCo Max II
CoCo Max II

⑩ *Logos and letterheads.*

System Requirements:

Any 64K CoCo and a standard joystick or mouse. (The koala pad and the track ball work, but are not recommended.)

Disk systems need a Multi-Pak or our Y-Cable.

CoCo Max is compatible with any Radio Shack DOS and ADOS.

Note: the tape version of CoCo Max includes almost all the features of CoCo Max II except *Shrink, Stretch, Rotate,* and *Glyphics.* Also, it has 5 fonts instead of 14.

CoCo Max is not compatible with JDOS, DoubleDOS, MDOS, OS-9, the X-pad, and Daisy Wheel Printers.

Printers Supported:

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, Hewlett-Packard Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC printers, Gorilla Banana.

Color printing: CGP-200, CGP-115

Pricing

CoCo Max on tape with Hi-Res Pack and manual.	$69.95
CoCo Max II (disk only) with Hi-Res Pack and manual.	$79.95
Upgrade: CoCo Max to CoCo Max II New disk and manual	$19.95
New features of CoCo Max II: 14 fonts and glyphic font, dynamic shrink and stretch, rotate, multiple drive capability, 68 page scrapbook, point and click file load, color printer drivers, full error reporting.	
Upgrade: CoCo Max tape to disk manuals, disk and binder	$24.95
Y-Cable: *Special Price*	$19.95
Super Picture Disks #1, #2, and #3 each:	$14.95
All three picture disks	$29.95

Guaranteed Satisfaction
Use CoCo Max for a full month. If you are not delighted with it, we will refund every penny.

Font Editor Option

A font is a set of characters of a particular style. CoCo Max includes 15 fonts. You can create new fonts of letters, or even symbols or graphics with the font editor. Examples: set of symbols for electronics, foreign alphabets, etc. $19.95

Video Digitizer DS-69

This new Low Cost Digitizer is the next step in sophistication for your CoCo Max system. With the DS-69 you will be able to digitize and bring into CoCo Max a frame from any video source: VCR, tuner, or video camera. Comes complete with detailed manual and C-SEE software on disk. Multi-Pak is required.

New Low Price Save $50	$99.95
New: faster DS-69A	$149.95

COLORWARE

Colorware Incorporated
79-04A Jamaica Avenue
Woodhaven, NY 11421

800 221-0916
Orders only.
NY & Info: (718) 296-5916
Hours: 9-5 Eastern time.

Add $3.00 per order for shipping.
We accept Visa, MC, checks, M.O.
C.O.D. add $3.00 extra.
NY and CT : add sales tax.
Shipping to Canada is $5.00
Overseas, FPO, APO add 10%

```
ETURN
1220 NN=5*N:FOR J=1 TO 4:K=NN-5+
J:A(K)=A(K+1):V(K)=V(K+1):NEXT:V
(NN)=V:A(NN)=ANG:RETURN
1230 LINE(142-W,150)-(143+W,150)
,PSET
1240 SS=-SGN(W)
1250 FOR I=1 TO 5:Y=150-I:X=140+
W+SS*I
1260 LINE(X,Y)-(X+1,Y),PSET
1270 Y=150+I:LINE(X,Y)-(X+1,Y),P
SET:NEXT
1280 RETURN
1290 REM
1300 REM ** MAIN DISPLAY
1310 REM
1320 CLS:PRINT:PRINT:PRINT:PRINT
"        ";:A$="*** BOMBS AWAY ***
"
1330 FOR I=1 TO LEN(A$):PRINT MI
D$(A$,I,1);
1340 POKE&HFF21,&H3C:POKE&HFF21,
&H34:FOR QW=1 TO 30:NEXT QW:NEXT
1350 PRINT:PRINT:PRINT "        B
Y ALLEN DRENNAN               1
986 COLOR CLOUD"
1360 FOR I=1 TO 2000:NEXT I
1370 CLS:A$="GAME RULES ARE SIMP
LE:":GOSUB 1540:PRINT
1380 PRINT
1390 A$="BLOW UP YOUR OPPONENT B
Y FIRING AT THE RIGHT ANGLE AND
VELOCITY,":GOSUB 1540
1400 PRINT
1410 A$="WHILE COMPENSATING FOR
WIND AND TERRAIN.  EACH GUNNER M
UST ENTER"
1420 A$=A$+"THE GUN ANGLE AND SH
ELL POWER.":GOSUB 1540
1430 PRINT:PRINT
1440 A$="THE ANGLE MUST BE BETWE
EN (0-90)":GOSUB 1540
1450 PRINT
1460 PRINT " PLAYERS NAMES :"
1470 FOR P=1 TO 2
1480 PRINT "PLAYER ";P;:LINE INP
UT", ";P$(P):IF LEN(P$(P))>10 TH
EN CLS:PRINT "10 CHARACTERS ONLY
!":GOTO 1460
1490 NEXT
1500 DEF FND(X)=RND(X)
1510 INPUT "HOW MANY BATTLES TO
PLAY ";GN
1520 IF GN<1 THEN PRINT"PLEASE,
DONT JOKE AROUND!":GOTO 1510
1530 GOTO 240
1540 FOR I=1 TO LEN(A$):PRINT MI
D$(A$,I,1);
1550 POKE &HFF21,&H3C:POKE &HFF2
1,&H34:FOR QW=1 TO 30:NEXT QW:NE
XT
1560 FOR I=1 TO 700:NEXT I
1570 RETURN
1580 CLS
1590 REM
1600 REM ** GAME REPORTS
1610 REM
1620 PRINT "THE SCORE:  ";P$(1);
:PRINT" =";S(1):PRINT P$(2);:PRI
NT" =";S(2)
1630 IF S(1)>S(2) THEN WI=1
1640 IF S(1)<S(2) THEN WI=2
1650 IF S(1)=S(2) THEN 1680
1660 PRINT "WINNER"
1670 GOTO 1700
1680 PRINT
1690 PRINT "A TIE !!!"
1700 PRINT "BETTER LUCK NEXT TIM
E !!!"
1710 END
1720 SCREEN 1,1:FOR RT=1 TO 15
1730 CIRCLE(X,Y),RT,3,1,.50,0
1740 NEXT RT
1750 FOR I=1 TO 1500:NEXT I:RETU
RN
```

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. If you do not receive your copy by the 5th of the month of the publication date, send us a card and we will mail another. Canadian subscribers and foreign airmail allow two additional weeks.

You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

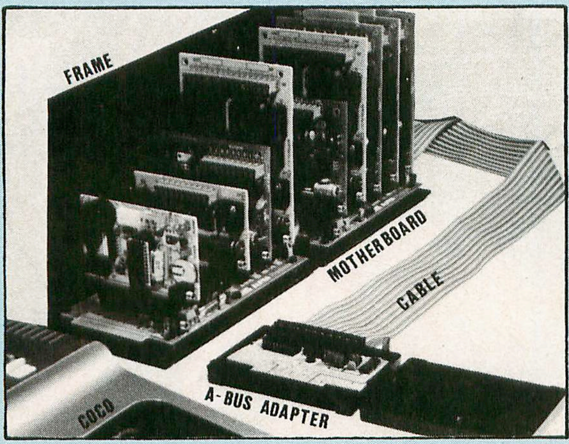
Your mailing label also shows an "account number" and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059. This applies to everyone *except* those whose subscriptions are through our distributor in Australia.

The Amazing A-BUS

NEW

What will you do with it?



An A-BUS system with 2 Motherboards and 9 Cards.

SHEILA wanted to set up a variety of experiments in her lab. With an A-BUS, the computer can watch the mice instead of Sheila.

HARRY has a model railroad layout that he wished to automate. Now his home computer controls the engines, gates, signals, etc. through the A-BUS.

BOB tests electrical fixtures as they leave the assembly line. He develops test equipment quickly with inexpensive, off-the-shelf, and easy to use A-BUS cards.

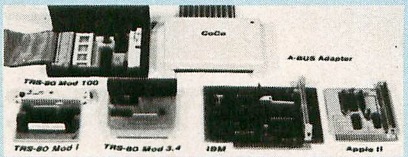
But what's an A-BUS? It's the easiest way to connect a variety of cards that sense and control anything outside the computer. With the A-BUS, your CoCo becomes an incredible machine.

What would I need? First, an *A-BUS Adapter* to convert your computer bus to the A-BUS standard. Then a *Cable* (with one or two slots) to connect one or two A-BUS Cards. If you need more than two cards, the cable will be connected instead to the *A-BUS Motherboard*, which has five slots. Up to five motherboards can be chained. Finally, add you choice of *A-BUS Cards* to fit your project.

I'm not an engineer. Can I use the A-BUS? If you can wire a switch, you can use the A-BUS. No computer hardware knowledge is needed! A screwdriver is all you need for many projects.

What about software? Simple PEEK and POKE commands control the whole system, whether you read the time on the clock, switch the relays, take a temperature reading, or turn a motor.

What if I change computers? Incredibly, this is as simple as replacing the inexpensive adapter card.



A-BUS Adapters

Special: Complete set of all user's manuals. Typeset, illustrated, with schematics. Only$10

CoCo to A-BUS Adapter AR-138: $49

Works with all CoCo's. Plugs into rom slot or Multipak.
Disk systems without Multipak need Y-cable ($19.95)

A-BUS adapter for: AApple II, II+, IIe.	AR-134...$49
IBM PC, XT, AT and all compatibles.	AR-133...$69
TRS-80 Models 100, 200.	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin I/O bus.	AR-132...$49
TRS-80 Model 4P. Includes extra cable.	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus.	AR-131...$39

A-BUS Motherboard MB-120: $99

Will accomodate five A-BUS cards. A sixth connector allows a second motherboard to be added to the first (with connecting cable CA-161...$12). Up to five motherboards can be joined this way to a single adapter. The motherboard is mounted on a sturdy aluminum frame with card guides.

A-BUS Cable (3 ft.) CA-163: $29

Connects Adapter to 1 A-BUS card or Motherboard.
Special Cable for two A-BUS cards CA-162...$39

Relay Card RE-140: $129

8 industrial relays on board. Contacts are rated at 3 amps. You can control up to 64 cards (512 relays) using several motherboards. Jumpers are used to simply select the card address. The card is easily controlled in BASIC with "OUT" or "POKE". For example, OUT 1,0 turns all the relays off on card #1. Eight LED's show which relays are on.

Digital Input Card IN-141: $49

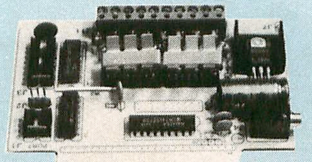
It's safe and easy to connect and read switches, keypads, thermostats, alarm loops, etc. The eight inputs can monitor the presence of voltage or switch position. Simple INP or PEEK commands read the status (On or Off) of the inputs. Each input is optically isolated for convenience and safety.

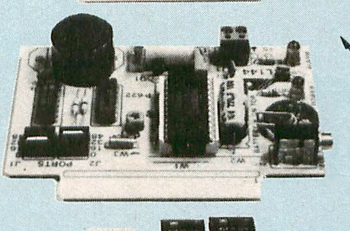
Analog Input Card AD-142:$119

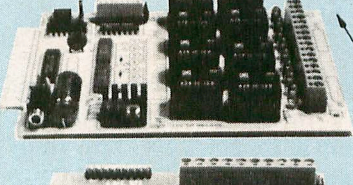
With this 8 bit, 8 channel A/D converter, your computer can read voltages, temperatures, pressures, light levels, etc. Take over 100 readings per second in BASIC (several thousand with machine language). It's simple to use, for example: OUT 1,3 selects channel #3, then A=INP(1) reads the voltage on that channel. Input range: 0 to 5.1V. Resolution: 20mV. Conversion time 120us.

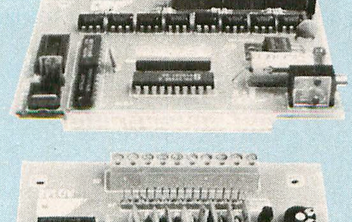
Prototyping Card PR-152: $15

Protocard is 3½ by 4½ in. and accepts up to 10 IC's.









12 Bit A/D Converter AN-146:$109

This high performance analog to digital converter features accuracy to 0.025%, 130ms conversion time, sign and over range indication. The basic input range is −5 to +5 volts, with 1.2mV resolution, but the gain of the on-board amplifier can be set to measure microvolts. Ideal for a strain gauge, thermocouple, pH meter, etc.

Motor Controller ST-143:$69

Stepper Motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with stepper motors: Each controller card drives **two** stepper motors (12V, bidirectional, 4 phase).
Motor: 48 steps/revolution, 300 steps/second, ¼" shaft: MO-103...$15. Power supply: PS-126...$10
Special Package: the controller card, *two* stepper motors, and power supply: **PA-181...$99**

Clock with Alarm CL-144:$89

It's the most powerful clock/calendar available. The features: • 5 second/month accuracy. • Keeps time, date, and alarm for 5 years (even with computer off). • Can time events down to 1/100 second. • Periodic "chime". • Full time and date alarm. • Four alarm outputs: Computer, LED, Buzzer, and Reed Relay. • Easy to use,: for example H=INP(1) reads the hours, Y=INP(6) reads the year, etc.

Latest Developments

Voice Synthesizer	VS-153
15 Bit Analog to Digital Converter	AD-155
Intelligent Stepper Motor Controller	ST-154
Digital to Analog Converter	DA-147
LCD Display (one and two line)	LD-151
Touch Tone® Decoder	PH-145
Counter Timer	CT-154
24 Line TTL Input/Output	DT-148

Order Line
Except in NY **800 221-0916**
Info and NY orders: **(718) 296-5916**
Technical Info: **(203) 656-1806**
All lines open weekdays 9 to 5 NY time.

Add $3.00 per order for shipping.
We accept Visa, MC, checks, M.O.
C.O.D. add $3.00 extra.
N.Y. residents add sales tax.
Shipping to Canada is $5.00
Overseas, FPO, APO add 10%

COLORWARE

Colorware Inc
79-04 Jamaica Ave
Woodhaven, NY 11421

The Goblins'll Getcha if You Don't Watch Out!

By Jean and Al Duerig

October magic casts its spell over a suburban neighborhood in *Halloween*. It is October 31 and you, dressed as a ghost, are the intrepid trick-or-treater determined to get your fair share of Halloween loot. But it won't be easy. Strange and bizarre things happen on the darkest night of the year. As you roam the streets, going from house to house, who knows what you may encounter?

Halloween includes a flying saucer, haunted house, lightning, a dog that may or may not be vicious and an assortment of ghosts and scary sounds.

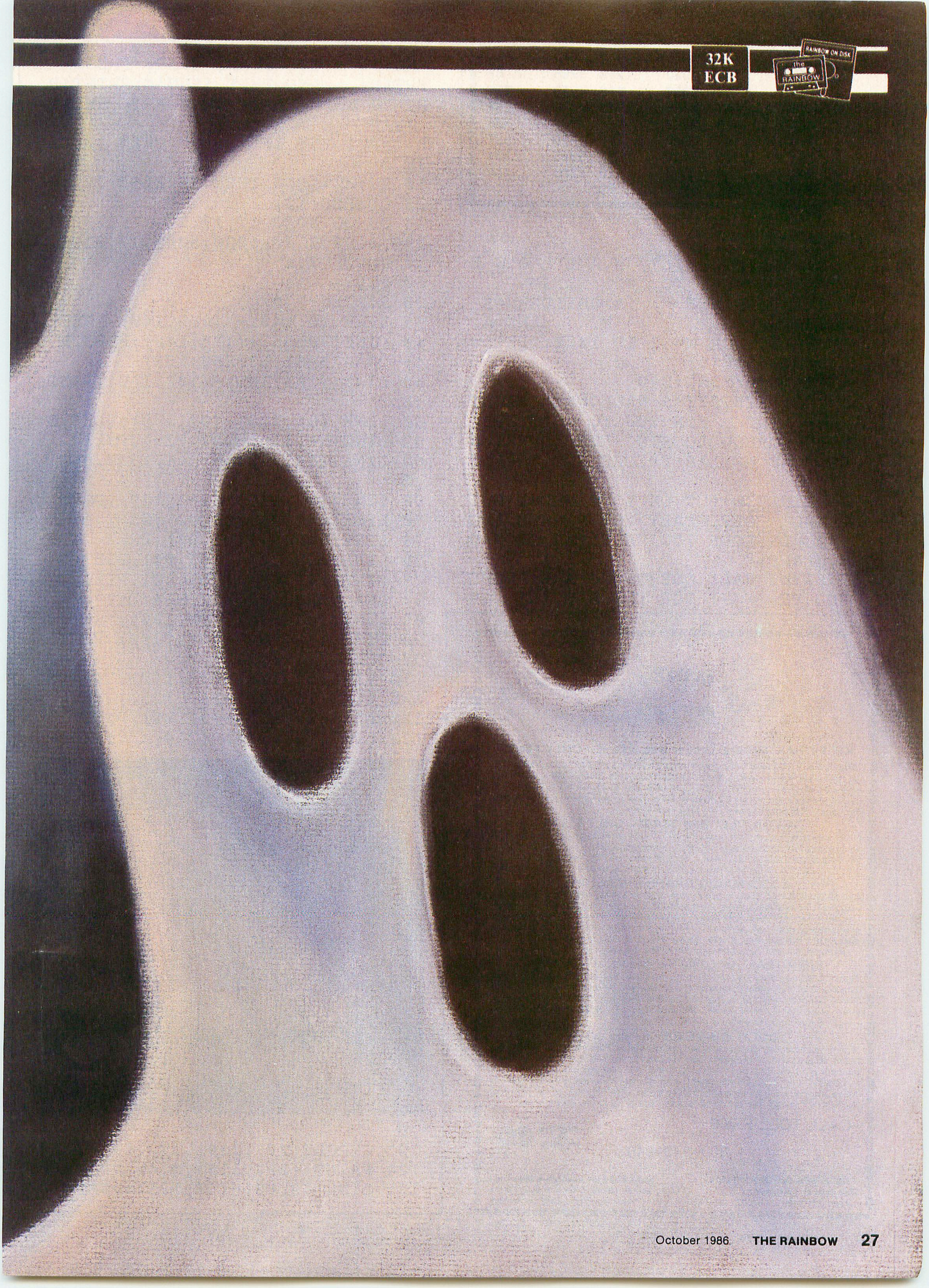
If unsatisfactory treats are received, you are given the option of playing a trick, but don't be too nasty or you may land in jail.

The game is simple for children of all ages, requiring only yes and no answers. It features 10 different graphics screens and requires 32K of memory. Points are accumulated by gathering desirable treats and can be lost for playing tricks or being a scaredy cat. Good luck!

(Questions about this program may be directed to the Duerigs at 203 Pinecrest Drive, Pittsburgh, PA 15237, 412-486-1888. Please enclose an SASE when writing.)

Jean and Al Duerig are CoCo enthusiasts who have enjoyed so many other games they decided to write their own. Jean is a foreign language teacher and Al is a telephone engineer.

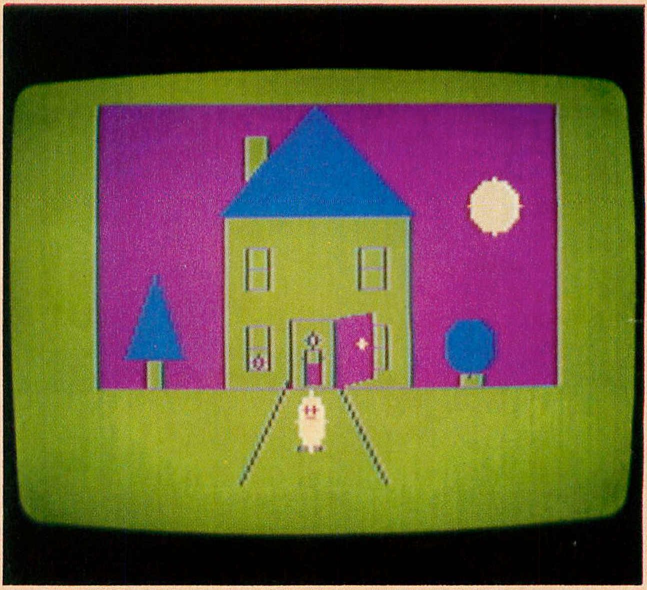
32K
ECB



17	107	2920	219	3785	87
135	57	3007	216	4030	211
540	251	3115	40	4090	48
680	179	3153	144	4232	138
769	101	3240	117	5150	37
781	162	3430	57	5345	251
792	30	3450	112	END	159
812	199	3710	79		

The listing: HALOWEEN

```
1 CLS:PRINT @ 167,"H A L L O W E
 E N":FOR W=1 TO 1000:NEXTW
2 PRINT:PRINT"      A CHILDREN'S
ADVENTURE             BY J. AND A.
 DUERIG":FOR W= 1 TO 1200:NEXT W
3 DIM G(23,75)
4 ZZ=1600:XX=0:S=0
5 CLS:PRINT"IT'S HALLOWEEN NIGHT
 AND TIME   FOR YOU TO ROAM THE
NEIGHBORHOODLOOKING FOR ADVENTUR
ES,  AS WELLAS TRICKS AND TREATS
."
6 PRINT"SO PUT ON YOUR GHOST SUI
T AND   GET READY FOR SIGHTS AND
 SOUNDS LIKE YOU'VE NEVER SEEN O
R HEARD."
7 PRINT "ALL QUESTIONS ARE ANSWE
RED BY   (Y) FOR YES AND (N) FOR
 NO.     TO  START OVER, PRESS '
BREAK'   AND TYPE 'RUN'":PRINT:P
RINT" WHEN READY TO START, ENTER
 'Y'"
8 INPUT Y$: IF Y$="Y" THEN 10 EL
SE 5
10 IF ZZ>1000 THEN 17 ELSE 12
12 QQ=RND(12)
14 ON QQ GOTO 17,17,17,17,3200,3
990,3100,3100,5000,5000,17,3500
17 PMODE 3,1
20 PCLS
30 SCREEN 1,0
35 LINE (0,140)- (255,140),PSET
40 LINE(70,55)-(175,140),PSET,B
45 DRAW"BM64,58;E58;F58"
50 LINE (108,105)-(132,140),PSET
,B
60 LINE (84,108)-(97,130),PSET,B
62 LINE(84,119)-(97,119),PSET
65 LINE (147,108)-(161,130),PSET
,B
68 LINE(147,119)-(161,119),PSET
70 LINE(84,70)-(97,90),PSET,B
73 LINE(84,80)-(97,80),PSET
75 LINE(147,70)-(161,90),PSET,B
78 LINE(147,80)-(161,80),PSET
80 DRAW"BM83,37;U22;R14;D12"
85 LINE(108,134)-(80,190),PSET
90 LINE(132,134)-(160,190),PSET
95 CIRCLE(113,119),2
110 LINE(27,125)-(36,140),PSET,B
115 LINE(15,125)-(48,125),PSET
120 LINE(15,125)-(32,80),PSET
122 LINE(201,140)-(214,133),PSET
,B
123 CIRCLE(207,119),17,.8
124 PAINT (207,119),3,4
125 LINE(32,80)-(48,125),PSET
```



THE OTHER GUY'S Software

NEW FREE CATALOG

'KEEP-TRAK' General Ledger Reg. $69.95—ONLY $24.95

"**Double-Entry" General Ledger Accounting System** for home or business: 16k, 32k, 64k. User-friendly, menu-driven. Program features: balance sheet, income & expense statement (current & 'YTD'), journal, ledger, 899 accounts & 2350 entries on 32k & 64k (710 accounts & entries on 16k) (disk only). Version 1.2 has screen printouts. Rainbow Reviews 1.1 - 9/84 : 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $19.95

Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field (4080 characters/record). Sort, match & print any field. User friendly menu driven. Manual included (32k/64k disk only).
Rainbow Review 3/85, Hot CoCo 10/85

BOB'S MAGIC GRAPHIC MACHINE

Can generate BASIC code to use in your programs. Easy drawing and manipulation of circles, elipses, boxes, lines and ARCS. Single joystick operation with on line HELPS at all times. Allows text on the graphics screen & movement of objects on the screen. Can be used as a stand-alone graphics editor. Instruction Manual. **GRAPHICS EDITOR.Reg. $39.95—ONLY $19.95** for disk or tape. 64k ECB.
Rainbow Review 7/85, Hot CoCo 9/85 "**The graphics bargain of the year**"

'KEEP-TRAK' Accounts Receivable. (Avail. 10/01/85).

Features: auto interest calculation, auto ageing of accounts, installment sales, total due sales, explanation space as long as you need, detailed statements, 'KEEP-TRAK' General Ledger tie in, account number checking, credit limit checking & more. User friendly/menu driven. Includes manual. **$39.95** or **$49.95** General Ledger & Accounts Receivables. (Disk Only).

'COCO WINDOWS' Available 10/31/85

With hi-res character display and window generator. Features an enhanced key board (klicks) and 10 programmable function keys. Allows the user to create multiple windows from basic. Includes menu driven printer setup and auto line numbering. Four function calculator. with memory. The above options can be called anytime while running or writing in BASIC. APPLE PULL YOUR DRAPES, YOU DON'T WANT TO SEE THIS. **$19.95** (disk or tape) includes manual.

CALL TOLL FREE

1-800-942-9402

VISA MasterCard

THE OTHER GUY'S SOFTware
P.O. Box H, 55 N. Main
Logan, UT 84321 (801) 753-7620

(Add $2.50 for postage & handling)
C.O.D., Money Order, Check in U.S. Funds
(Please specify if J&M controller)

```
130 PAINT(119,132),3,4
135 PAINT(73,53),3,4
140 PAINT(17,123),3,4
144 PAINT(66,60),4,4
149 PAINT(180,60),4,4
155 CIRCLE(220,50),15,2
160 PAINT(220,50),2,2
167 LINE (113,170)-(125,172),PSE
T,B
168 CIRCLE(118,157),9,2.3,2
169 PAINT(118,157),2,2
170 CIRCLE(117,151),2
173 CIRCLE(121,151),2
175 LINE (117,155)-(120,155),PSE
T
176 IF ZZ>200 THEN ZZ=ZZ-200
177 FOR W=1 TO ZZ:NEXT W
179 CLS
180 PRINT @96,"DO YOU WANT TO RI
NG THE DOORBELL"
182 INPUT A$: IF A$="Y" THEN 190
 ELSE 1000
190 PRINT @168,"TRICK OR TREAT!"
198 SOUND170,9:SOUND 145,10
200 FOR D=1 TO 800:NEXT D
515 PMODE 3,1
520 PCLS
525 SCREEN 1,0
530 LINE (0,140)- (255,140),PSET
535 LINE(70,55)-(175,140),PSET,B
540 DRAW"BM64,58;E58;F58"
545 LINE (108,105)-(132,140),PSE
T,B
550 LINE (84,108)-(97,130),PSET,
B
555 LINE(84,119)-(97,119),PSET
560 LINE (147,108)-(161,130),PSE
T,B
565 LINE(147,119)-(161,119),PSET
570 LINE(84,70)-(97,90),PSET,B
575 LINE(84,80)-(97,80),PSET
580 LINE(147,70)-(161,90),PSET,B
585 LINE(147,80)-(161,80),PSET
590 DRAW"BM83,37;U22;R14;D12"
595 LINE(108,134)-(80,190),PSET
600 LINE(132,134)-(160,190),PSET
610 LINE(27,125)-(36,140),PSET,B
615 LINE(15,125)-(48,125),PSET
620 LINE(15,125)-(32,80),PSET
625 LINE(201,140)-(214,133),PSET
,B
630 CIRCLE(207,119),17,.8
635 PAINT (207,119),3,4
640 LINE(32,80)-(48,125),PSET
650 PAINT(73,53),3,4
655 PAINT(17,123),3,4
660 PAINT(66,60),4,4
665 PAINT(180,60),4,4
670 CIRCLE(220,50),15,2
675 PAINT(220,50),2,2
680 LINE (113,170)-(125,172),PSE
T,B
685 CIRCLE(118,157),9,2.3,2
690 PAINT(118,157),2,2
695 CIRCLE(117,151),2
700 CIRCLE(121,151),2
705 LINE (117,155)-(120,155),PSE
T
715 LINE(133,105)-(152,102),PSET
720 LINE(152,102)-(152,135),PSET
725 LINE(152,135)-(133,140),PSET
730 PAINT (134,107),4,4
735 PAINT(148,109),4,4
736 PAINT(148,120),4,4
740 CIRCLE(147,117),2,2
745 LINE(108,105)-(132,140),PSET
,B
750 CIRCLE(120,115),5
755 CIRCLE(120,124),7,.7
760 LINE(117,127)-(125,138),PSET
,BF
762 CIRCLE(90,126),5
763 PSET(90,126)
764 PAINT (90,126),2,4
765 FOR W=1 TO ZZ:NEXT W
768 TR$="BECAUSE OF THE INSULT R
ECEIVED  AT THIS HOUSE YOU HAVE
THE       OPTION TO TRICK.  DO YO
U WANT    TO TRICK?"
769 H$="DO YOU WANT TO TRICK OR
TREAT   AGAIN? "
770 T=RND(12)
773 ON T GOTO 775,777,779,781,78
3,795,797,802,783,5350,5353,5356
775 CLS:PRINT"YOU GOT A NICE LOL
LIPOP WORTH 10POINTS SO YOUR SCO
RE IS
                         ";S+10:S
=S+10
776 PRINT:PRINT H$: INPUT R$: IF
 R$="Y" THEN GOSUB 3500 ELSE 100
0
777 CLS:PRINT:PRINT"YOU GOT A DO
LLAR AND CAN ADD 100 POINTS TO Y
OUR SCORE WHICH IS   NOW
                                "
;S+100:S=S+100
778 PRINT:PRINT:PRINT:PRINTH$:IN
PUT R$:IF R$="Y" THEN GOTO 3180E
LSE 1000
779 CLS:PRINT"YOU GOT A CHOCOLAT
E BAR WORTH 20POINTS AND NOW HAV
E A SCORE OF
                         ";S+20:S
=S+20
780 PRINT:PRINT:PRINTH$:INPUT A$
```

```
:IF A$="Y" THEN GOTO 10 ELSE 1OO
O
781 CLS:PRINT"YOU GOT A COOKIE A
ND CAN ADD 15 POINTS TO YOUR SCO
RE. YOUR SCOREIS NOW WORTH
                            ";S+1
5:S=S+15
782 PRINT:PRINT:PRINTH$:INPUT A$
:IF A$="Y" THEN GOTO 5000 ELSE 1
000
783 CLS:GOTO 3990
784 FOR W=1 TO 700:NEXT W
785 Q=RND(5)
786 ON Q GOTO 790,790,790,787,78
8
787 S=S-10:PRINT:PRINT"YOU'RE LU
CKY THAT THE DOG IS    FRIENDLY
AND ONLY WANTS ONE OF  YOUR COOK
IES. THAT COSTS YOU 10 POINTS AN
D YOUR SCORE IS NOW
    ";S:GOTO 789
788 S=S+150:PRINT:PRINT"IT'S A V
ERY FRIENDLY STRAY DOG  AND WANT
S TO GO HOME WITH YOU.  HE'S WOR
TH 150 POINTS, SO YOUR  SCORE IS
 NOW
    ";S
789 FOR W=1 TO 1000:NEXT W:PRINT
:PRINT H$:INPUT R$:IF R$="Y" THE
N 10 ELSE 1000
790 CLS:PRINT:PRINT"        THE D
OG BIT YOU.   ":FOR W=1 TO 1000:
NEXT W:PRINT:PRINT"             O
UCH!!":GOTO 799
792 PRINT:PRINT:PRINTH$:INPUT R$
:IF R$="Y" THEN 10 ELSE 1000
795 CLS:PRINT"YOU GOT AN APPLE H
ERE ADD 20     POINTS TO YOUR SCO
RE. YOUR SCOREIS NOW
                            ";S+20
:S=S+20
796 PRINT:PRINT:PRINTH$:INPUT A$
:IF A$="Y" THEN 5000 ELSE 1000
797 CLS:S=S-20:PRINT:PRINT"YOU G
OT AN APPLE AND CAN ADD -  UGH!,
YOU JUST FOUND A WORM IN   THE A
PPLE SO SUBTRACT 20 POINTS.YOUR
SCORE IS NOW
    ";S
799 FOR W=1 TO 800:NEXT W:PRINT:
PRINTTR$:INPUT A$:IF A$="Y" THEN
 GOSUB 2900 ELSE 10
800 PRINTH$:INPUT A$:IF A$="Y" T
HEN 10 ELSE 1000
802 PMODE 0,1:PCLS:SCREEN 1,1
803 FOR X=1 TO 4
804 PCLS 1
805 FOR W=1 TO 200:NEXT W
806 PCLS 2
807 FOR W=1 TO 150: NEXT W
808 NEXT X
810 SOUND 1,20
812 CLS:PRINT"THAT WAS LIGHTNING
 AND YOU'D     BETTER GO HOME TIL
L THIS STORM   PASSES OVER.  YOU
ALSO LOSE 15   POINTS.":S=S-15:PR
INT:PRINT"YOUR NEW SCORE IS ";S
815 FOR W=1 TO 1500:NEXT W
816 PRINT @ 360,"TRICK OR TREAT?
"
817 INPUT A$:IF A$="Y" THEN 198
ELSE 1000
1000 CLS:PRINT:PRINT:PRINT"
     GOODNIGHT"
1001 PRINT:PRINT"   YOUR FINAL S
CORE IS:";S
1002 END
2900 CLS
2901 RESTORE
2902 PRINT @ 70, "TRICKS YOU CAN
 DO"
2904 PRINT:PRINT
2906 DATA DUMP GARBAGE,SOAP WIND
OWS,CHASE CAT,MAKE FACES,DYNAMIT
E HOUSE
2908 FOR M=1 TO 5
```

ORDER PHONE (416) 456-0032
To order or for further information or program suggestions please write: Duck Productions, 18 Rowe Court, Brampton, Ontario, Canada L6X 2S2
WATCH FOR **MACHINE GENESIS**, a three program utility and tutorial for beginner exploration of machine language progamming. **COMING SOON!**

DUCK QUALITY COMPUTER PRODUCTS PRODUCTIONS

AMERICAN EXPRESS

KEEPING TRACK

NINE PROGRAMS, so easy they're almost user independent! More than the average diskette management sysyem, ITS A BOOT UTILITY!

YOU'LL WANT THIS KEYSTROKE BOOT EVERYTIME YOU POWER UP!

Creator builds the "**D**"**irectory** program with your inputed I.D. names on your disks. **D** will load and run basic or binary programs, on any drive, with a single keystroke. **D** gives continuous access to directories without retyping DIR and auto displays the disk I.D. names, program names/ext/type/size and free disk space. **Directory Print** accesses **D** for your disk I.D., programs and free space to format and output your program catalogue, to your printer. **Comparison** backup utility, compares backup disks and by keystroke, copies missing files to either disk. **Directory Saver** copies directories to a safe area. On dir crash, a keystroke will repair the damage. Other programs include ***Alpha Directory** reorder*, **Disk Address** finder, and **True Drive Test.** All programs fully documented. $29.95, ($38.95 CDN)

RAINBOW CERTIFICATION SEAL

MAP'n ZAP

The laymans kit for disk repair. Step by step procedure to repair directories and grain tables. Locates errors, maps out disk contents with printer or screen output, will backup any flawed disk, and prompts built in disk zap for repair. Complete with documented tutorial on disk input/output operation, access. $19.95, ($24.95 CDN)

MICRO • FIRE

Have you beat your thumbs more than the aliens? You need a secret weapon! This automatic rapid fire circuitry package can be added to any joystick. It has on/off control and does not affect computer when not in use. No extra power supply required. Installation in minutes, preassembled hardware comes with complete instructions. Custom component has adjustable rate of fire and comes with a full calibration program. $19.95, ($24.95CDN)

CODE BUSTER disassembler

Explore machine language programming with an easy, accurate breakdown of any binary program. Screen or full printer output with helpful hints to understanding your ROM. Simple prompted procedure will answer questions in your study. Fully documented instructions. $19.95, ($24.95CDN)

```
2910 READ T$
2912 PRINT M;:PRINT "  ";    :PR
INT T$'
2914 NEXT M
2916 PRINT:PRINT:PRINT"CHOOSE A
TRICK BY NUMBER"
2918 INPUT T
2919 FOR W=1 TO 1500:NEXT W
2920 ON T GOTO 3000,3003,2934,29
32,4200
2930 GOTO 2900
2932 CLS:S=S-20:PRINT:PRINT"GHOS
TS CAN'T MAKE FACES SO YOU  LOSE
 20 POINTS FOR BEING SILLY. YOUR
 SCORE IS NOW
         ";S:GOTO 2945
2934 CLS:PRINT:PRINT"THE CAT WEN
T UP A TREE SO NO    CHANGE IN T
HE SCORE."
2945 RETURN
3000 X=RND(3)
3001 ON X GOTO 3002,3004,3004
3002 CLS:PRINT:PRINT:PRINT:PRINT
"YOU LOST YOUR NERVE SO THERE IS
 NO CHANGE IN YOUR SCORE. YOUR
 SCORE REMAINS       ";S:RETURN
3003 CLS:PRINT:PRINT"YOU GOT AWA
Y WITH SOAPING THE    WINDOW SO Y
OU MAY ADD 25 POINTS TO YOUR SCO
RE WHICH IS NOW
                               ";
S+25:S=S+25:RETURN
3004 CLS:PRINT:PRINT"YOU GOT CAU
GHT DUMPING GARBAGE  CANS AND HA
VE BEEN ARRESTED.    IT'S  ALL O
VER FOR YOU  TONIGHT AND  YOUR S
CORE IS ZERO.":FF=0
3005 FOR BB=1 TO 1500: NEXT BB
3006 PMODE 3,1:PCLS:SCREEN 1,0
3007 CIRCLE(125,95),20,2.3,2
3009 PAINT(125,95),2,2
3012 CIRCLE(118,83),2,4
3015 CIRCLE(131,83),2,4
3017 CIRCLE(125,92),6,4,.75,.5,.
99
3019 LINE (110,130)-(140,132),PS
ET,BF
3022 LINE (40,30)-(210,133),PSET
,B
3025 FOR X=40 TO 210 STEP 17
3030 LINE(X,30)-(X,133),PSET
3031 NEXT X
3032 Z$="BU8;R8;G8;R8;BR4"
3033 O$="U8;R8;D8;L8;BR12"
3036 IF FF=1 THEN 3037 ELSE 3038
3037 DRAW"BM110,150"+Z$+O$+O$
3038 FOR W=1 TO 3500: NEXT W
3039 S=0
3040 U=RND(2)
3045 ON U GOTO 10,1000
3100 PMODE 1,3:PCLS:SCREEN 1,1
3105 CIRCLE(50,50),15
3106 PAINT (143,80),3,4
3107 LINE(100,185)-(180,125),PSE
T,B
3110 LINE-(140,85),PSET 'ROOF
3112 LINE-(100,125),PSET
3115 LINE(110,160)-(125,130),PSE
T,BF
3117 LINE(155,160)-(170,130),PSE
T,BF
3120 LINE (130,130)-(149,185),PS
ET,B
3122 CIRCLE(134,157),2
3125 LINE(160,105)-(160,90),PSET

3127 LINE -(175,90),PSET
3128 LINE-(175,115),PSET
3129 Y=185
3130 FOR X= 1 TO 250 STEP 3
3131 G=RND(12):COLOR 2,4
3132 LINE(X,Y)-(X,Y-G),PSET
3134 NEXT X
3135 X=167:Y=89
3136 SP=0:EP=0
3137 FOR R=1 TO 20 STEP .05
```

UPGRADE YOUR COCO WITH THE SUPERCOMP68008 BOARD FROM CIR-PAK LTD
IMPROVE YOUR DISPLAY WITH THE HIGH RESOLUTION GRAPHIC DISPLAY BOARD

THE SC68008 BOARD FEATURES:
- 8/16/32 BIT INTERNAL PROCESSING
- 8K EPROM MONITOR (SPARE USER SPACE)
- 1 CENTRONIC PARALLEL PRINTER PORT
- 256K DYN. RAM (UP TO 512K WITH JUMPER)
- 1 8-BIT I/O SPARE PORT
- DMA OPERATION WITH COCO BUS
- COPROCESSING MODE
- MC68008 ONLY MODE

SIMPLY PLUG THE SC68008 BOARD INTO THE EXPANSION PORT OF YOUR COCO AND PLUG THE DISK CONTROLLER INTO THE SC68008 BOARD. NO MODIFICATION TO YOUR SYSTEM IS REQUIRED.

PCB ONLY WITH EPROM MONITOR	99$ US
ASSEMBLED & TESTED WITH 256K DRAM	339$ US
STEEL CASING FOR THE SC68008 BD	39$ US
INFORMATION PACKAGE	2$ US

NEW SOFTWARE FOR THE SC68008

RSDOS - 256K RAMDISK	39$ US
OS9 - 256K RAMDISK	59$ US
OS9 - DRIVER FOR THE SC68008	29$ US
OS9 - CODE TRANSLATOR TO GENERATE A 68000 SOURCE FROM A 6809 CODE WITH LABELS, VARIABLES TABLE, AND DISASSEMBLES 6809 CODES FOR COMMENTS.	49$ US
68008 - MONITOR SOURCE LISTING	20$ US

TO ORDER:
SEND CERTIFIED CHECK OR MONEY ORDER
ADD 4$ FOR SHIPPING & HANDLING
ADD 5$ FOR C.O.D. SALES

US DEALER ORBIT ELECTRONICS
P.O. BOX 613
DERBY LINE, VT05830
TEL:(819) 876-2926

HI RES GRAPHIC DISPLAY FEATURES:
- NEC7220 GRAPHIC DISPLAY CONTROLLER
- RESOLUTION: 640 X 220 STD
- SOFTWARE DRIVER - MACHINE LANGUAGE
- HI QUALITY PCB WITH GOLD PLATED CONTACTS
- 28 SOCKETED I.C.S. - HIGH SPEED
- 75 OHM COMPOSITE VIDEO OUT.
- MANUAL WITH COMPLETE CIRCUIT DIAGRAM
- 32K ON BOARD DRAM
- EASILY ADAPTABLE TO NON STANDARD WIDE BAND MONITORS (640 X 400 NON INTERLACED)

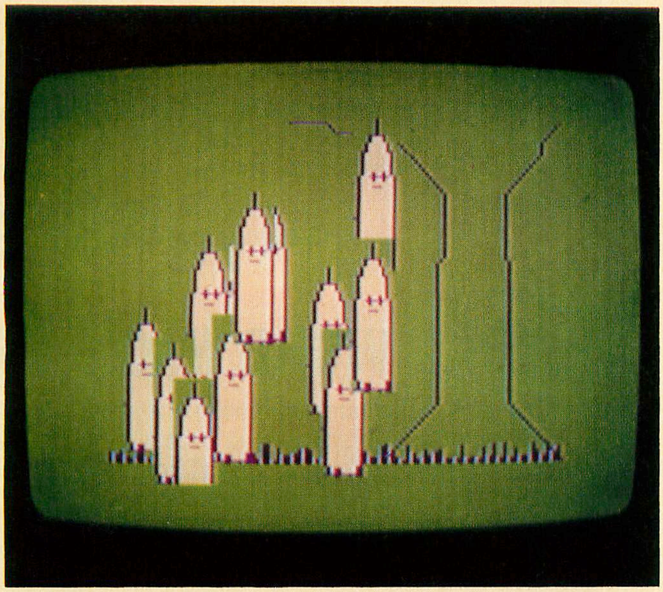
* ASSEMBLED & TESTED 299$ US CASING 39$ US
* INFORMATION PACKAGE 3$ US

*** THIS BOARD WORKS WITH OR WITHOUT SC68008 ***

IN CANADA CIR-PAK LTD
P.O. BOX 410
VARENNES QC
J0L 2P0

```
3140 EP=EP+.02:IF EP>.5 THEN EP=
0
3143 CIRCLE(X+R,Y-R),R,4,1,SP,EP
3145 NEXT R
3146 FOR W=1 TO 600:NEXT W
3147 CLS:PRINT"AN ECCENTRIC OLD
MAN LIVES HERE AND HAS A FIRE IN
 HIS FIREPLACE.  THE SMOKE LOOKS
 LIKE A GHOST."
3148 PRINT:PRINT"DO YOU DARE TO
TRICK OR TREAT    HERE?"
3150 INPUT A$: IF A$="Y" THEN 31
53 ELSE 3157
3153 X=RND(2):ON X GOTO 3155,315
6
3155 CLS:PRINT:PRINT"THE OLD MAN
 IS REALLY AN ESCAPEDCONVICT AND
 HE TOOK AWAY ALL    YOUR GOODIE
S.YOUR SCORE IS ZERO":S=0:PRINT:
GOTO 3158
3156 CLS:PRINT"HE IS REALLY A NI
CE FRIENDLY    FELLOW SO YOU GET
 25 POINTS FOR BEING BRAVE AND 1
0 EXTRA POINTS FOR SHARING YOUR
CANDY WITH HIM":S=S+35:PRINT:PRI
NT"YOUR SCORE IS NOW ";S:PRINT:G
OTO 3158
3157 CLS:PRINT:PRINT"YOU LOST YO
UR NERVE SO YOU LOSE 25 POINTS F
OR BEING A SCAIRDY   CAT ": S=S-
25: PRINT"YOUR SCORE IS NOW ";S:
GOTO 3158
3158 FOR W=1 TO 700:NEXT W:PRINT
:PRINTH$:INPUT A$:IF A$="Y" THEN
 10 ELSE 1000
3180 D=RND(3)
3182 CLS
3185 ON D GOTO 17,3200,3200
3200 IF XX=2 THEN 10
3202 PMODE 3,1:PCLS
3205 SCREEN 1,0
3210 SS=190
3230 CIRCLE(20,150),12,,4,.4,.1
3240 LINE (10,174)-(30,174),PSET
3250 PAINT (20,150),2,4
3260 DRAW "BM155,180;E30;U70;E3;
U30;H20;H5;L15;H5;L15;H5;L20"
3270 DRAW"BM255,180;H30;U70;H3;U
30;E20;U5;E10"
3280 CIRCLE(24,130),2
3290 CIRCLE(18,130),2
3300 LINE (18,135)-(22,135),PSET
3310 FOR X=1 TO 255 STEP 3
3320 Y=RND(10)
3330 COLOR 4,3
3340 LINE(X,180)-(X,180-Y),PSET
3350 NEXT X
3370 GET (9,175)-(32,100),G,G
3380 FOR T=1 TO 11
3390 X=RND(140)
3400 Y=RND(150)
3410 PUT(X,Y)-(X+23,Y+75),G,PSET
3415 SOUND SS,3:SS=SS+2
3420 NEXT T
3423 FOR W=1 TO 1200:NEXT W
3424 CLS
3425 PRINT:PRINT"YOU ARE IN THE
WOODS AND GHOSTS ARE POPPING UP
EVERYWHERE BUT   YOU MUST CROSS.
":PRINT
3426 FOR W=1 TO 2000:NEXT W
3427 X=RND(4)
3430 ON X GOTO 3431,3433,3432,34
41
3431 PRINT"YOU FAINTED AND CANNO
T CONTINUE.ALL SCORE IS LOST AND
 YOU MUST  GO HOME.":S=0:GOTO 34
45
3432 PRINT"THE GHOSTS WERE ABOUT
 TO GET YOUBUT A FLYING SAUCER S
UDDENLY    LANDED AND SCARED THE
M AWAY":FOR W=1 TO 2673:NEXT W:G
OTO 3500
3433 PRINT"YOU SCREAMED A LOT BU
T HAVE    STAGGERED OUT OF THE
WOODS.NEXT TIME BE MORE BRAVE BU
T YOU GET  25 POINTS FOR THE EFF
ORT": S=S+25:PRINT"YOUR SCORE IS
 ";S
3435 FOR V=1 TO 3
3436 SOUND 211,15
3437 FOR Z=1 TO 180:NEXT Z
3438 NEXT V
3439 GOTO 3445
3440 FOR V=1 TO 3
3441 PRINT"YOU ARE VERY BRAVE AN
D MADE IT  TO THE OTHER SIDE WIT
H 50 EXTRA POINTS":S=S+50:PRINT"
YOUR SCORE IS";S:GOTO 3445
3442 FOR Z=1 TO 200:NEXT Z
3443 NEXT V
3445 FOR W=1 TO 2400:NEXT W
3448 XX=XX+1
3450 GOTO 10
3500 PMODE 1,3
3510 PCLS
3520 SCREEN 1,1
3530 CIRCLE(120,150),40,,3.5,0.5
,.75
3540 CIRCLE(120,150),40,,3.5,.75
,0
3550 DRAW"BM80,150;R26;U30;R26;D
30;R26;L56"
3560 CIRCLE(110,134),2
3570 CIRCLE(97,90),5
3580 CIRCLE(112,90),5
3590 CIRCLE(127,90),5
3600 CIRCLE(142,90),5
```

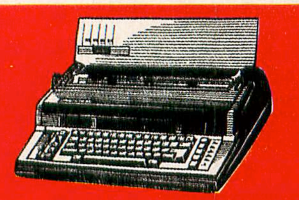
```
3610 PAINT(125,140),7,8
3620 LINE(149,58)-(181,31),PSET
3630 LINE(93,58)-(64,31),PSET
3640 DRAW"BM158,38;E15;F15;G15;H
15;E8;F15"
3650 DRAW"BM86,36;H15;G15;F15;E1
5;H8;G15"
3660 DRAW "BM120,15;U12;NR12;NL1
2;ND12;NE12;NF12;NG12;NH12"
```



```
3670 CIRCLE(120,140),95,,0.45 ,.
83,.68
3680 PAINT(125,110),6,8
3690 FOR T=1 TO 10
3700 PAINT (97,90),8,8:PAINT(112
,90),8,8
3710 PAINT(127,90),8,8:PAINT(142
,90),8,8
3730 PRESET(97,90):PRESET(112,90
)
3740 PRESET(127,90)
3750 PRESET (142,90):PRESET(110,
134)
3754 SOUND 100,4
3760 FOR W=1 TO 100:NEXT W
3770 NEXT T
3772 Z$="D2G1BE1BU2BR12"
3773 O$="U8R6D8L6BR12"
3778 CLS:PRINT"THIS IS A FLYING
SAUCER WHICH   HAS LANDED ON YOU
R STREET.   DO YOU WANT TO TRICK
 OR TREAT HERE?"
3779 INPUT A$:IF A$="Y" THEN 378
2 ELSE 10
3780 GOTO 3780
3782 X=RND(3): ON X GOTO 3783,37
85,3787
3783 PRINT"YOU FOUND THEM FRIEND
LY AND THEYGAVE YOU A MARS BAR P
LUS 30      POINTS": S=S+30: PRIN
T"YOUR SCORE IS ";S:PRINT
3784 FOR W=1 TO 1500:NEXT W:PRIN
T H$:INPUT A$:IF A$="Y" THEN 10
ELSE 1000
3785 PRINT"THIS IS A TRICK ON YO
U TO        CAPTURE A HUMAN SPECI
MEN FOR THEMARTIAN ZOO SO  THE G
AME IS      OVER FOR YOU":FOR W=1
 TO 1500:NEXTW:FF=1:GOTO 3006
3787 PRINT"THEY TRIED TO CAPTURE
 YOU BUT    YOU WERE TOO SMART FO
R THEM AND ESCAPED.  YOU GET 40
POINTS FOR YOUR CLEVERNESS.":S=S
+10:PRINT"YOUR SCORE IS ";S
3788 FOR W=1 TO 1500:NEXT W:PRIN
T:PRINTH$:INPUT A$:IF A$="Y" THE
N 10 ELSE 1000
3990 CLS:PRINT @133,"BEWARE OF T
HE DOG!!!"
3992 FOR W=1 TO 1100:NEXT W
4000 PMODE 0,1
4001 JJ=0
4002 PCLS
4004 SCREEN 1,0
4006 LINE(10,50)-(60,58),PSET
4008 LINE-(75,30),PSET
4010 LINE-(85,55),PSET
4012 LINE-(120,75),PSET
4014 LINE-(165,75),PSET
4016 LINE-(210,80),PSET
4018 LINE-(240,69),PSET
4020 LINE-(225,55),PSET
4022 LINE-(250,73),PSET
4024 LINE-(225,100),PSET
4026 LINE-(220,160),PSET
4028 LINE-(210,160),PSET
4030 LINE-(200,120),PSET
4032 LINE(10,50)-(10,57),PSET
4034 LINE-(55,80),PSET
4036 LINE-(20,95),PSET
4038 CIRCLE(77,70),4
4040 LINE-(20,100),PSET
4042 LINE-(60,95),PSET
4044 LINE-(90,110),PSET
4046 LINE-(85,160),PSET
4048 LINE-(105,160),PSET
4050 LINE-(110,117),PSET
4052 LINE(106,158)-(120,157),PSE
T
4054 LINE-(127,120),PSET
4056 LINE-(167,125),PSET
4058 LINE-(187,120),PSET
4060 LINE-(197,158),PSET
4062 LINE-(209,158),PSET
4064 PMODE 0,2:PCLS
4066 LINE (10,80)-(60,58),PSET
4068 LINE-(75,30),PSET
4070 LINE-(85,55),PSET
4072 LINE-(120,75),PSET
4074 LINE-(165,75),PSET
```

Howard Medical Computers

We have Rainbowfest prices year 'round!



SMITH CORONA

Smith Corona offers the latest and best in typewriter technology including a built-in 50,000 word dictionary and spelling checker that beeps as a spelling error is made, a full line lift off correction feature!

($7 shipping) **$286**

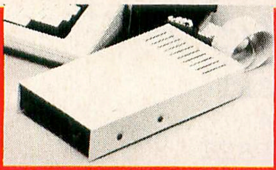
Special interface plug unit transforms the Smith Corona typewriter into a wordprocessing printer for your color computer. Includes both serial and parallel output.

$96

NEW FROM J&M

The DC-4 is a stripped down version of the very popular DC-2 and includes all the same features such as memory minder automatic format recognition, gold circuits, metal box, and software selectable tract seek rate except for ROM switch and parallel port.

($2 shipping) **$65**



TEAC 55B

The Teac 55B fits into the spare slots in the Radio Shack 501 Disk Drive. This bare drive features 40 Track, double sided 360K potential and a six millisecond track seek rate.

($2 shipping) **$132**

The **DD-2** combines the Teac 55B with our ½ height horizontal case and heavy duty power supply.

($2 shipping) **$188**

GUARANTEE

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatability. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back, (less shipping).

RS DOS ROM CHIP

ROM chip fits inside disk controller. 24 pin fits both J&M and RS controller Release 1.1.

Reg. $40
($2 shipping) **$20** each

BOTEK

Serial to parallel converter converts the CoCo 4 pin serial output to run a parallel printer like Star or Epson. Includes all cables. Add $10 for modem attachment.

($2 shipping) **$68⁴⁵**

WORD PACK RS

This ROM pack is the hardware answer for an 80 column display. It includes a built-in video controller to drive a monochrome monitor like our 123A. To get started, you need OS-9 2.0, a Y-cable or multipack interface drive 0, and a monochrome monitor.

($2 shipping) **$89**

New basic driver runs word pack without need for an OS-9. **$10**

SOFTWARE SPECIALS

PAYROL/BAS™

Written in nonprotected basic for the color computer. This easy-to-use package of programs will simplify and decrease the time spent doing payroll. *Rainbow* May 1986 review says, "Elegant and professional." State and federal tables are already included. Send $1 for 11 page reports guide.

$79⁹⁵

VIP LIBRARY

Softlaw's integrated package includes VIP writer terminal, data base, call and disk zap which can fix a diskette that is giving I/O errors.

$125

SAP-II

Stock analysis program organizes your portfolio and gives specific sell and stop-loss points.

$19⁹⁵

BPA-1

Chart your blood pressure from daily readings taken in the comfort of your home.

$19⁹⁵

$2 shipping on software

Howard Medical Computers 1690 N. Elston Chicago, IL 6062

ORDERS
(800) 443-1444

INQUIRIES AND ORDER STATUS
(312) 278-1440

Showroom Hours:
8:00 – 4:00 Mon. – Fri.
10:00 – 3:00 Sat.

WE ACCEPT: VISA • MASTERCARD • AMERICAN EXPRESS
C.O.D. OR CHECKS • SCHOOL P.O.'S

The Biggest
The Best
The Indispensable

ORDER RAINBOW ON DISK NOW AND SAVE!

As a special introductory offer, you can subscribe to **RAINBOW ON DISK** before January 1, 1987, for only $90 — **$9 off** the regular subscription price. *Don't miss out — order today!*

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

It's called the *premier Color Computer magazine* for good reason. **THE RAINBOW** is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! Is there any wonder we get letters daily praising **THE RAINBOW**, the magazine one reader calls "A Pot Of Gold" for his Color Computer.

THE RAINBOW features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

A monthly issue contains more than 200 pages and up to two dozen programs, 14 regular columns and as many as 20 product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Hundreds of programs are advertised in its pages each month.

But what makes **THE RAINBOW** is its people. Nationally known people like Bill Barden, who has written 27 books on computer topics and writes for us each month. Or, Fred Scerbo, who writes special programs at the request of readers. Experts like Dick White and Joseph Kolar, two of the most knowledgeable writers on BASIC. Communicators like Marty Goodman and Cray Augsburg, who stay abreast of telecommunications advances. Or, Dan Downard, **RAINBOW** technical editor, who answers our readers' toughest questions. Educators like Dr. Michael Plog and Steve Blyn, who show how CoCo can be used at home or school. Advanced programmers like Dale Puckett, who guide you through the sophisticated OS-9 operating system. Electronics experts like Tony DiStefano, who explain the "insides" of the CoCo. These people, and many others, visit you monthly through columns available only in **THE RAINBOW**.

Every single issue of **THE RAINBOW** covers the wide spectrum of interests in the Tandy Color Computer — from beginners' tutorials and arcade games to telecommunications and business and finance programs. Helpful utilities and do-it-yourself hardware projects make it easy and fun to expand your CoCo's capabilities. And, monthly reviews by independent reader reviewers take the guesswork out of buying new software and hardware products.

Join the tens of thousands who have found **THE RAINBOW** to be an absolute necessity for their CoCo. With all this going for it, is it surprising that more than 90 percent of **THE RAINBOW** subscribers renew their subscriptions?

We're willing to bet that, a year from now, you'll be doing the same. For more information call (502) 228-4492. **For _credit card orders only_, you may call (800) 847-0309.**

Give Your Fingers A Break!

	RAINBOW ON TAPE	RAINBOW ON DISK
Full Year (12 Issues)	*$80**	*$90* (regularly $99)*
Single Issue	*$10***	*$12***

YES! Sign me up: ☐ *NEW* ☐ *RENEW (attach label)*
☐ *RAINBOW ON TAPE* ☐ *RAINBOW ON DISK*
☐ *A Full Year* ☐ *Single Issue (specify month & year)* ______
Name ______
Address ______
City ______ State ______ ZIP ______
☐ Payment Enclosed (payment must accompany order)
Charge: ☐ VISA ☐ MasterCard ☐ American Express
Account Number ______
Signature ______ Card Expiration Date ______

For credit card orders, you may want to phone in your subscription; our *orders only* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries, please call (502) 228-4492.

*Subscriptions to **RAINBOW ON TAPE** are $80 a year in the United States, $90 U.S. funds in Canada and $105 U.S. funds in all other countries. Special introductory subscriptions through January 1, 1987, to **RAINBOW ON DISK** are $90 (regularly $99) a year in the United States, $100 (regularly $115) U.S. funds in Canada, and $115 (regularly $130) U.S. funds in all other countries.
Individual issues of **RAINBOW ON TAPE are $10 in the United States, $12 U.S. funds in Canada and all other countries. Individual issues of **RAINBOW ON DISK** are $12 in the United States, $14 U.S. funds in Canada and $16 U.S. funds in all other countries.
Kentucky residents add 5% sales tax. **In order to hold down non-editorial costs, we do not bill.**
RAINBOW ON TAPE and **RAINBOW ON DISK** are not stand-alone products; you will still need the magazine for loading and operating instructions and the necessary documentation. **THE RAINBOW** magazine is a separate purchase.

Get Your Very Own Pot O' Gold!

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year! A subscription to **THE RAINBOW** is only $31* and you won't miss a single chock-full issue.

As the premier magazine for the Tandy Color Computer, **THE RAINBOW** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **THE RAINBOW** today!

We accept VISA, MasterCard and American Express, Non-U.S. rates higher. **U.S. currency _only_, please.**

YES! Sign me up for a year (12 issues) of **THE RAINBOW.**
☐ *NEW* ☐ *RENEW (attach label)*
Name ______
Address ______
City ______ State ______ ZIP ______
☐ Payment Enclosed (payment must accompany order)
Charge: ☐ VISA ☐ MasterCard ☐ American Express
Account Number ______
Signature ______ Card Expiration Date ______

For credit card orders, you may want to phone in your subscription; our *orders only* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries, please call (502) 228-4492.

*Subscriptions to **THE RAINBOW** are $31 a year in the United States. Canadian rate is U.S. $38. Surface rate elsewhere is U.S. $68. Air mail U.S. $103. All subscriptions begin with the current issue. Please allow 6 to 8 weeks for first copy. Kentucky residents add 5% sales tax. **In order to hold down non-editorial costs, we do not bill.**

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

Two great ways to bring the Rainbow into your life . . .

Just for your COLOR COMPUTER 1, 2 and 3
September 1986
Canada $4.95 U.S. $3.95
The RAINBOW
THE COLOR COMPUT
MAGAZINE
New Color Computer 3
CoCo Better Again!
Our Ann
RAINBOW
on tape
NOVEMBER 1986

Rainbow on Tape & Rainbow On Disk!

For more than four years now, tens of thousands of **RAINBOW** readers have enjoyed the luxury of **RAINBOW ON TAPE**. Each month our tape service subscribers receive all the great programs from the pages of **THE RAINBOW** (those over 20 lines long), without the trouble of having to type them in.

Now, in addition to **RAINBOW ON TAPE**, there is **RAINBOW ON DISK** — another great way to bring **THE RAINBOW** into your life.

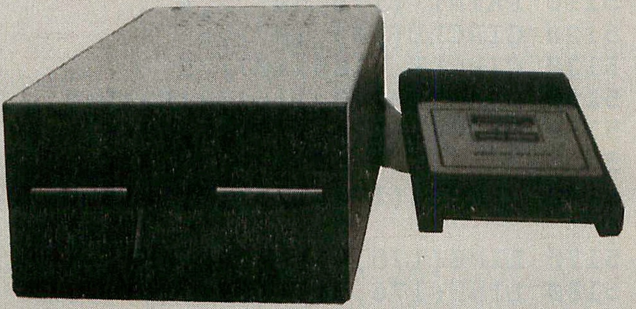
Each month, all you do is pop the tape into your cassette player or the disk into your drive. No more lost weekends typing, typing, typing. As soon as you read an article about a program in **THE RAINBOW**, it's ready to load and run. No work. No wait.

Yes, you could type the programs in yourself, as many people do. But all of them? Every month? There simply isn't enough time.

Just think how your software library will grow. With your first year's subscription, you'll get almost 250 new programs: games, utilities, business programs, home applications — the full spectrum of **THE RAINBOW**'s offerings without the specter of keying in page after page of listings and then debugging. And, with **RAINBOW ON DISK**, you'll also get all the OS-9 programs.

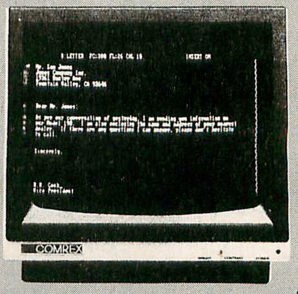
RAINBOW ON TAPE and **RAINBOW ON DISK** — as we've said before, they're the "meat" of **THE RAINBOW** at a price that's "small potatoes." And now you even have a choice about how it should be served up to you.

To get your first heaping helping, just fill out and return the attached reply card. No postage necessary.



Drive 0 and 1 **269^{95}**

One double sided drive with doubler board and new RS controller so you can have the equivalent of 2 drives in one. You can even backup from 0 to 1. Works with all CoCo's.



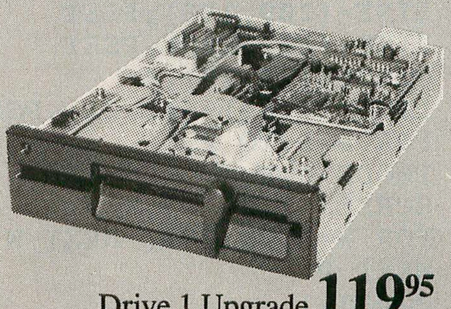
SOLD OUT **AMBER MONITOR** **59^{95}**

Epson's Comrex 5650 has a 12" screen with 900 lines. Resolution for 80 column text and 18 MHZ band width, retail price was 139.95. 13" Color Monitor (not shown), now only $139.95. These are new, in factory sealed cartons, NOT used, repacked, or refurbished. Add 7.00 s/h. Monitor Interface for any color Computer 29.95.

---

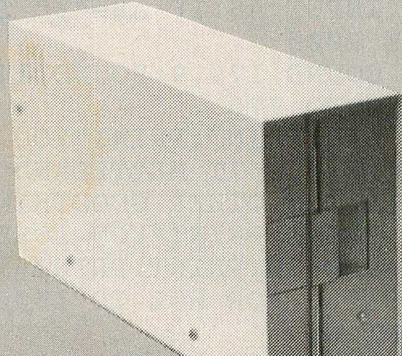
2 Drives **299^{95}**

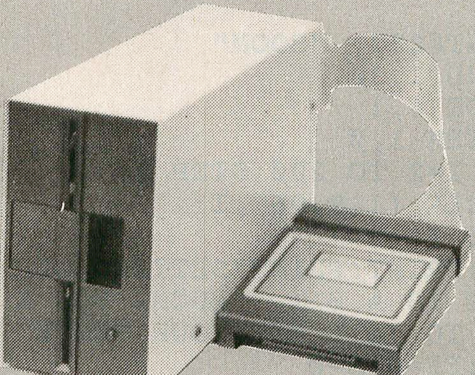
Both our drive 0 and 1 in one case, with cable and R.S. controller. The best just got better!



Drive 1 Upgrade **119^{95}**

Add a second 1/2 height drive to your Radio Shack® 26-3129. Comes with 3 minute installation instructions, screwdriver required. Double sided version (Drive 1 and 2) and doubler board add 79.00





Drive 1 **125^{95}**

Your Choice
Silver or White

199^{95} Drive 0

SUPER DRIVE SALE

Special prices on new first quality disk drives. They even have GOLD connectors on the back... Some other places charge 229.00 for dr. 1 and 299.00 for dr. 0, not us! Drive 1 is for mod I, Second Color Computer drive, or external mod III, IV. Drive 1 just plugs into the extra connector on your Drive 0 cable. Both drives are compatible with any version of the Color Computer and all versions of drives. Drive 0 is your first Color Computer drive and comes complete with cable, manual, and R.S. controller. For double-sided drive and doubler board add 79.00 (for Drive 0 & 1 or 1 & 2). Bare full hgt SSDD drive only 79.95.

THE COMPUTER CENTER
901-761-4565, 5512 Poplar, Memphis, TN 38119

Add $4.90 for shipping and handling—Visa, MC & money orders accepted, No CODs
Allow an additional 2 weeks for personal checks—Drive faceplates may vary slightly

Prices subject to change without notice. Radio Shack is a registered trademark of Tandy Corporation

```
4076 LINE-(210,80),PSET
4078 LINE-(230,69),PSET
4080 LINE-(255,55),PSET
4082 LINE-(250,73),PSET
4084 LINE-(225,100),PSET
4086 LINE-(220,160),PSET
4088 LINE-(210,160),PSET
4090 LINE (10,81)-(15,89),PSET
4092 LINE -(65,96),PSET
4094 LINE-(90,110),PSET
4096 LINE-(85,160),PSET
4098 LINE -(105,160),PSET
4100 LINE-(110,117),PSET
4102 LINE(106,158)-(120,157),PSE
T
4104 LINE-(127,120),PSET
4106 LINE-(167,125),PSET
4108 LINE-(187,120),PSET
4110 LINE-(197,158),PSET
4112 LINE-(209,158),PSET
4114 LINE-(197,120),PSET
4116 CIRCLE(77,70),4
4118 LINE(17,85)-(42,81),PSET
4120 FOR P=1 TO 2
4122 PMODE 0,P
4124 SCREEN 1,0
4126 FOR W=1 TO 200: NEXT W
4128 NEXT P
4129 JJ=JJ+1
4130 IF JJ<>7 THEN 4120
4150 GOTO 784
4200 PMODE 4,1
4202 PCLS
4204 SCREEN 1,1
4226 CLS
4230 PRINT@237, "BOOM"
4232 SOUND 1,30
4234 PMODE 4,1
4236 SCREEN 1,0
4238 FOR I=2 TO 200 STEP 2
4240 CIRCLE (128,96),I
4242 NEXT I
4258 CLS:PRINT:PRINT"SETTING OFF
 DYNAMITE IS A BIT   MUCH. YOU A
RE GOING TO JAIL AND YOUR SCORE
IS ZERO":FF=0:S=0
4260 GOTO 3005
5000 PMODE 3,1
5010 PCLS
5020 SCREEN 1,0
5030 LINE(0,170)-(255,170),PSET
5040 LINE(5,170)-(75,35),PSET, B
5050 CIRCLE(65,100),4
5060 LINE(20,50)-(30,65),PSET,B
5070 LINE(105,144)-(245,41),PSET
,B
5080 PAINT (45,65),3,4
5090 LINE(110,140)-(240,45),PSET
,B
5100 CIRCLE(175,115),27
5110 PAINT (175,50),2,4
5120 CIRCLE(165,107),5
5130 CIRCLE (185,107),5
5140 DRAW"BM172,116;E3;F3;L4"
5150 CIRCLE(174,126),8,,0.5,0,0.
5
5160 CIRCLE(174,125),8,,0.5,0,0.
5
5170 LINE(175,91)-(180,75),PSET
5180 LINE(176,91)-(181,75),PSET
5190 LINE(174,91)-(179,75),PSET
5200 CIRCLE(220,45),25,,2,.25,.5
5210 LINE(220,95)-(210,140),PSET
5220 LINE(220,95)-(240,90),PSET
5230 CIRCLE(130,45),25,,2,0,.25
5240 LINE (128,90)-(140,138),PSE
T
5250 LINE(128,90)-(112,87),PSET
5260 FOR X=1 TO 10
5270 PAINT(165,107),4,4:PAINT(18
5,107),4,4
5280 PRESET(164,107):PRESET (185
,107)
5290 PRESET(163,107):PRESET(185,
107)
5300 PRESET(164,108):PRESET(185,
108)
5310 PRESET(164,106):PRESET(185,
106)
5320 FOR W=1 TO 300:NEXT W
5330 NEXT X
5340 CLS:PRINT @96 ,"DO YOU WANT
 TO RING THE DOORBELL?"
5342 INPUT A$:IF A$="Y" THEN 534
4ELSE 1000
5344 SOUND 170,9:SOUND 145,10
5345 GOTO 770
5350 CLS:PRINT:PRINT"YOU GOT A P
OPSICLE BUT IT MELTEDAND MESSED
UP ALL THE OTHER GOODTHINGS"
5351 PRINT:PRINT"YOU LOSE 30 POI
NTS":S=S-30:PRINT:PRINT"YOUR SCO
RE IS ";S:FOR W=1 TO 1500:NEXT W
:PRINT H$
5352 INPUT A$:IF A$="Y" THEN 10
ELSE 1000
5353 S=S+35:CLS:PRINT:PRINT"YOU
GOT A POPCORN BALL WORTH 35 POIN
TS SO YOUR SCORE IS NOW
     ";S:FOR W=1 TO 1500:NEXT W
:PRINT:PRINT H$
5354 GOTO 5352
5356 S=S+45:CLS:PRINT:PRINT"YOU
GOT A BAG OF CANDY CORN     WORT
H 45 POINTS SO YOUR SCORE IS
     ";S:FOR W=1 TO 1400:NEXT
W:PRINT:PRINT H$
5357 GOTO 5352
```

The Power of the Palette: Graphics on the Color Computer 3

By Rick Adams and Dale Lear

We're all excited that the increased resolution and number of colors of the Color Computer 3 graphics display produces more spectacular and colorful graphics. But there are other implications to the method of graphics support provided by the new Graphics Interrupt Memory Enhancer (GIME) chip that are even more astounding.

With the previous SAM/VDG chips in the Color Computer 1 and 2, a maximum of four colors was available, chosen from one of two available sets of four specific colors — no exchanges or substitutions allowed. With the GIME chip, all the rules of color selection for graphics display have changed. You may display up to 16 colors out of a palette that contains your own color set chosen from a total of 64 possible colors.

Thus, Color Computer 3 software utilizes more high resolution displays with many more colors than we've seen previously. The edges of objects on the screen are smoother, too. The ability to choose your own color set leads to a less cartoon-like representation of objects on the display, with less dependence on hacker tricks like color "aliasing" (artifacting) to generate more appropriate colors.

Less obvious, but very important to note, is the fact that this palette scheme of specifying color sets enables us to use a completely new form of computer animation. Presently, there are two major methods of animating Color Computer graphics: the screen-flip technique and the draw-redraw technique. Screen-flip involves keeping two copies of the screen, drawing one of them while the other is being displayed, then reversing the process. Draw-redraw simply means that you use one screen which is displayed all the time; your spaceship (or whatever) is erased at its previous position, and redrawn at its new position. But now we also may use a third method, called the palette-switching method: Display the entire screen, including objects drawn in various colors, and then change the values of the colors set in the palette after they are drawn.

If you change the red in your palette to blue, then all of the objects previously displayed in red will *instantaneously* change to blue — just like magic! With a little trickery, this technique can be used to make portions of the screen flash, or pulse on and off in various colors. Objects may be instantly changed to the background color (making them disappear), or changed from the background color to a visible color, making them seem to appear out of nowhere. A bird could be made to flap its wings by making the up position of the wings visible, then making the up position disappear and making the down position of the wings visible. So here is another major new graphics animation technique available to the Color Computer 3 user. No longer are we held to merely four colors. We're only limited to 16 colors at a time . . . or are we?

Another new piece of hardware in the CoCo 3, the programmable interrupt timer, enables us to use yet another new technique to provide up to 64 colors on the screen at a time! Using this technique, the programmable interrupt timer is set to interrupt the computer four times during every screen redraw. At the top of the screen, the interrupt routine sets the palette with 16 colors. One-quarter of the way down the screen, the timer interrupts again. Sixteen *other* colors are put into the palette, and so on. In effect, one 16-color palette is active for the first one-quarter of the screen, another palette is active for the next quarter screen, and so on.

Sure, it's one of those nasty hacker tricks, and the normal BASIC user isn't going to want to bother with it. But software developers just love this kind of thing, and you can expect them to use it to their advantage.

So, if you see some software come out that uses 64 colors at once, don't scratch your head and say "that's impossible." You'll be able to say, "Hey, I know how they did that; I read about it in THE RAINBOW!"

Rick Adams is a systems programmer for a company that develops 68000-based systems software. In addition to writing games, he likes science fiction and is the author of Radio Shack's Temple of ROM. *Rick lives in Rohnert Park, California.*

Dale Lear owns Dale Lear Software and makes his living developing programs for the Color Computer. He has authored games and other software such as Double Back, Baseball, TSEDIT, TSWORD *and* D.L. *LOGO. Dale, his wife Laurel and their six children live in Petaluma, California.*

Rainbow Tunnel

The *Rainbow Tunnel* is a short BASIC program that demonstrates the range of colors available on the Color Computer 3, while at the same time showing an interesting use of the PALETTE command to provide animation.

Lines 90 through 140 set the high speed mode, and tell BASIC to go to the end of the program at Line 640 if the BREAK key is pressed. The high-speed POKE is *guaranteed* to work on the Color Computer 3. And the new ON BRK command is a welcome addition.

Lines 160 through 250 load the graphics palette with a set of colors that closely approximate the spectrum from red to purple — a rainbow, in other words. The color codes used appear in the DATA statement at Line 200. Lines 270 through 360 create, and then paint, a series of concentric circles. The circles are painted with the colors of the rainbow. In lines 380 through 440, the concentric circles that formed the borders for the PAINT command are drawn again in colors that match the painted regions near them, rather than in colors that were appropriate to use for a paint border.

So far, we have a brilliant, multicolored display on the screen, but where is the animation? Have patience. When the program gets down to Line 490, the magic begins. The loop at Line 490 looks pretty simple, so check the subroutine at lines 520 through 580. The palette colors are changed in such a way that each concentric circle appears to move one position outward, thus giving the illusion that you are traveling down a brightly-colored "rainbow tunnel." But actually, nothing is moving at all! The color assignments, specified by the palette values, are moving, not the actual display data. This effect would be even more spectacular from assembly language, in which a considerable delay would have to be put in the loop so that the display would not look like a blur!

Finally, we come to the end routine at lines 600 through 650. The PALETTE RGB command sets the colors back to their defaults. Otherwise, when we press BREAK, the screen might be in a color set so weird we couldn't read it.

When we watched this program run for the first time, there was a long silence, followed by this conversation:

Dale: "You *couldn't do* that before on a Color Computer!"

Rick: "You couldn't even do it *badly*!"

Who's Waggin' the Wheel?

Wagon Wheel is a short BASIC program that demonstrates a new animation technique that was unavailable to the color computer world until the CoCo 3.

Lines 120 through 150 perform a few set-up calls, including some new features.

Lines 200 through 350 draw a wheel with spokes. The spokes, however, are drawn in a very special way. Fourteen groups of equally spaced spokes are each assigned a different color (or palette register).

As you watch the spokes being drawn, they look colorful. However, they look a little close together, and they certainly don't appear to be moving!

Now the magic begins. Lines 420 through 440 set the 14 palette registers assigned to the spokes, all to white (the background color). What happens? All the spokes disappear.

Now we get to lines 510 through 560. By setting only one of the 14 palette registers assigned to the spokes to black, every 14th spoke appears. By constantly cycling through the 14 registers setting only one at a time to black, the wheel now appears to turn.

Of course, nothing is really moving. No drawing is being done at all. The palette values are changing, causing the illusion of animation. ☐

Listing 1: TUNNEL

```
10 '****************************
20 '*     "RAINBOW TUNNEL"     *
30 '*     DEMO TO SHOW USE     *
40 '*  OF PALETTE REGISTERS    *
50 '*   TO SIMULATE MOTION     *
60 '*BY RICK ADAMS & DALE LEAR*
70 '****************************
80 '
90 '***************
100 ' SET HIGH SPEED
110 '***************
120 POKE &HFFD9,0
130 DIM CC(32)
140 ONBREAK GOTO 640
150 '
160 '***************
170 ' SET UP COLORS
180 '***************
190 HSCREEN 2
200 DATA 49,50,51,52,53,22,23,24
,55,56,57,58,59,60,61,62
210 FOR I=0 TO 15
220 READ CC(I)
230 CC(I+16)=CC(I)
240 NEXT I
250 GOSUB 560
260 '
270 '***************
280 ' PAINT CIRCLES
290 '***************
300 FOR I=0 TO 19
310 R=8+I*8
320 C=I AND 15
330 HCIRCLE(160,96),R,1
340 HPAINT (156+R,96),C,1
350 HPAINT (164-R,96),C,1
360 NEXT I
370 '
380 '***************
390 ' PAINT THE LINES
400 ' BETWEEN CIRCLES
410 '***************
420 FOR I=0 TO 19
430 HCIRCLE(160,96),8+I*8,I AND
15
440 NEXT I
450 '
460 '***************
470 ' LOOP
480 '***************
490 GOSUB 560
500 GOTO 490
```

COMPUTERIZE YOUR BUSINESS

with COMPUTERWARE®
Affordable Business Software

Through
October 31st
All Business Software
$99
Payroll — $149

Computerware is proud to present affordable business applications that are easy to use for your CoCo! We are able to offer our powerful business software without requiring any additional software. **All you need is 64K and two disk drives!**

Computerware's business applications have been in use for over 5 years, so you know they are **proven and well-tested.** They are not tutorials, though, and do assume you know and use sound accounting principals. However, these menu-driven systems are truly user-friendly and are accompanied by comprehensive manuals.

GENERAL LEDGER $125

This is a comprehensive double-entry accounting system with complete audit trails, closing procedures, and full reporting. The chart of accounts is flexible and the system easy to use. Reports include the General Ledger, Trial Balance, Balance Sheet, Income Statement, and Transaction Register. Your financial information is at your fingertips!

CHECK LEDGER $125

This is a single-entry bookkeeping system which allows the users to define a chart of income and expense accounts. Year-to-date totals are maintained for each account as well as complete checking account history. By just entering your checking account information, you can have always-current visibility over your income and expense ledgers. Financial statements and taxes are a snap!

PAYROLL $175

This is the most comprehensive payroll you'll find on a micro-computer. Besides collecting key employee information, it allows entry of pay rates for standard hours, overtime, and salary. Hourly, salary, and commissioned employees may be paid weekly, bi-weekly, semi-monthly, and monthly. Two types of special monthly deductions are also accommodated. Year-to-date, quarterly, monthly and current totals are maintained. All federal reporting is done automatically and your state computations are also included.

INVENTORY CONTROL $125

This system is designed to help the retailer, distributor, or businessman to keep control of this important factor. It stores your cost and quantity information, updates it immediately, and offers you key management reports with useful summaries at any time. With four costs, four locations, selling history, and vendor information for each item, you will always have the facts!

ACCOUNTS PAYABLE $125

This system can give you the tools to plan your business' growth by controlling expenditures and forecasting cash requirements. It helps a small business manage and track its cash liabilities by collecting vendor invoice information and reporting the business' cash commitments and payment history. Along with standard payables reports, it also includes a check writer and payment forecast reports.

ACCOUNTS RECEIVABLE $125

All businesses need to know who owes them money! This system provides reliable and timely information regarding the status of all customer accounts. You can know instantly which accounts are past due, forecast how much money to expect to receive for cash flow planning, and keep on top of your customers' credit positions. Customer name, address, credit limit, invoice, and payment information is recorded and reports of all information including customer statements are available upon your request.

COMPUTERWARE ®

P.O. Box 668 • Encinitas, CA 92024 • (619) 436-3512

Computerware is a federally registered trademark of Computerware.

Dealer Inquiries Invited

```
510 '
520 '***************
530 ' SUBROUTINE TO
540 ' CHANGE PALETTE
550 '***************
560 FOR I=0 TO 15:PALETTE I,CC(I
+K):NEXT I
570 K=(K-1)AND 15
580 RETURN
590 '
600 '***************
610 ' RESET PALETTE
620 ' ON BREAK
630 '***************
640 PALETTE RGB
650 STOP
```

Listing 2: WHEEL

```
10 '****************************
20 '*        "WAGON WHEEL"     *
30 '*     DEMO TO SHOW USE     *
40 '*  OF PALETTE REGISTERS    *
50 '*    IN ANIMATATION        *
60 '*BY RICK ADAMS & DALE LEAR*
70 '****************************
80 '
90 '**************
100 ' SET UP
110 '**************
120 POKE &HFFD9,0
130 HSCREEN 2
140 HCLS(1)
150 PALETTE 0,24
160 '
170 '**********************
180 ' DRAW OUTSIDE OF WHEEL
190 '**********************
200 HCIRCLE (160,96),90,0
210 HPAINT (0,0),0,0
220 '
230 '**********************
240 ' DRAW SPOKES
250 K=14*8
260 '**********************
270 FOR I=0 TO K-1
280 X=90*SIN(I*3.14/K)
290 Y=90*COS(I*3.12/K)
300 HCOLOR 2+14*(I/14-INT(I/14))
,1
310 HLINE (160+X,96+Y)-(160-X,96
-Y),PSET
320 NEXT I
330 FOR I=1 TO 30
340 HCIRCLE (160,96),I,0
350 NEXT I
360 '
370 '**********************
380 ' SET ALL PALETTE
390 ' COLORS TO WHITE
400 ' EXCEPT ONE
410 '**********************
420 FOR I=1 TO 15
430 PALETTE I,255
440 NEXT I
450 '
460 '************************
470 ' ROTATE WHEEL BY SETTING
480 ' ONE PALETTE REGISTER
490 ' AT A TIME T BLACK
500 '************************
510 K=2
520 KK=K+1
530 IF KK=16 THEN KK=2
540 PALETTE K,255:PALETTE KK,0
550 K=KK
560 GOTO 520
570 '
580 '*************************
590 ' RESTORE PALETTE ON BREAK
600 '*************************
610 PALETTE RGB
620 STOP
```

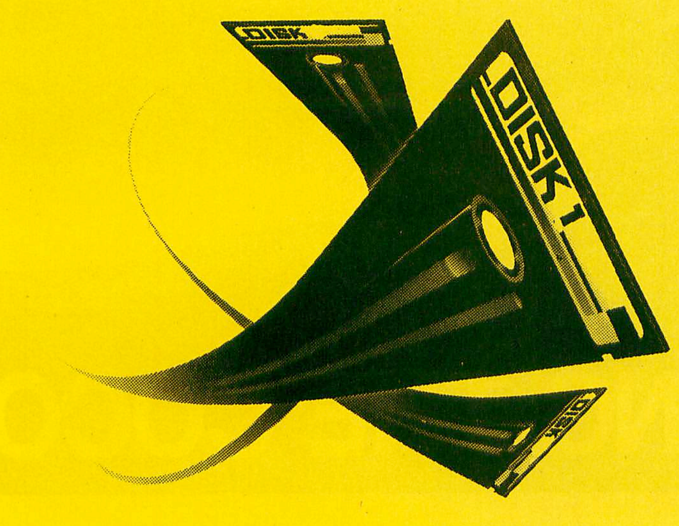
About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059



They're here! All NEW Products for the CoCo 3!

Color Connection IV

by BJ Chambless

New features include 80 columns, higher baud rates, and more! This is the most comprehensive modem package for the CoCo 3. All standard protocols are supported including CompuServe's Protocol B, XMODEM protocol, and XON/XOFF. Full support of the auto answer/auto dial feature for both Hayes compatible and some Radio Shack modems is provided. Single key macros allow easy entry of often-used passwords and ID's with a single key stroke.

Requires 128K, CoCo 3, Disk **$49.95**

Color Scribe II

This great Word Processor can take full advantage of the 80 column display of the CoCo 3. Justification, Headers, Footers, and Pagination make it perfect for letters and documents as well as programming in BASIC, PASCAL, "C", and Assembly Language. (A special option allows you to disengage the formatter, allowing more free memory for program editing.) Over 20 line editing commands include capabilities like character insert and delete, skip over words, breaking a line, and more! A complete, easy-to-understand manual accompanies your disk.

Requires 128K, CoCo 3, Disk **$49.95**

The Magic of Zanth

by Scott Cabit

In the Land of Zanth, magic is commonplace. Dragons, Griffins, Centaurs and Demons abound. You are sent on a quest to discover the source of magic in the land of Zanth. This intriguing adventure features over 2 dozen hi-res 16 color animated graphic screens, 4 voice music and sound effects, and speech (when used with the Tandy SSC pak). The 16 color, 320 x 192 graphics look great on either a composite color monitor, an analog RGB monitor, or a television.

Requires 128K, CoCo 3, Disk, (SSC pak optional) **$34.95**

Return of Junior's Revenge

by BJ Chambless

This is the same Junior you've seen in the Kong *arcade* series, but with new CoCo 3 graphics. This tireless little monkey must overcome all sorts of obstacles (4 screens worth) to rescue his father, The King, from the mean zookeeper. He will traverse the jungle and swamp, climb vines, avoid chompers and birds, open locks and more before he finally meets with his big daddy. The 16 color, 320 x 192 graphics are superb on either a composite color monitor, an analog RGB monitor, or a television.

Requires 128K, CoCo 3, Disk **$34.95**

Call or write for our NEW fall/winter catalog

It's filled with special prices and coupons for extra savings

By the time you read this ad . . .

. . . even more products will be available for the new CoCo 3.

. . . many OS-9 products will be available to run on OS-9 Level 2.

Order your FREE catalog today!!!

Introductory Special
$3.00 off any order for CoCo 3 Software
offer expires October 31, 1986

Call or Write to:

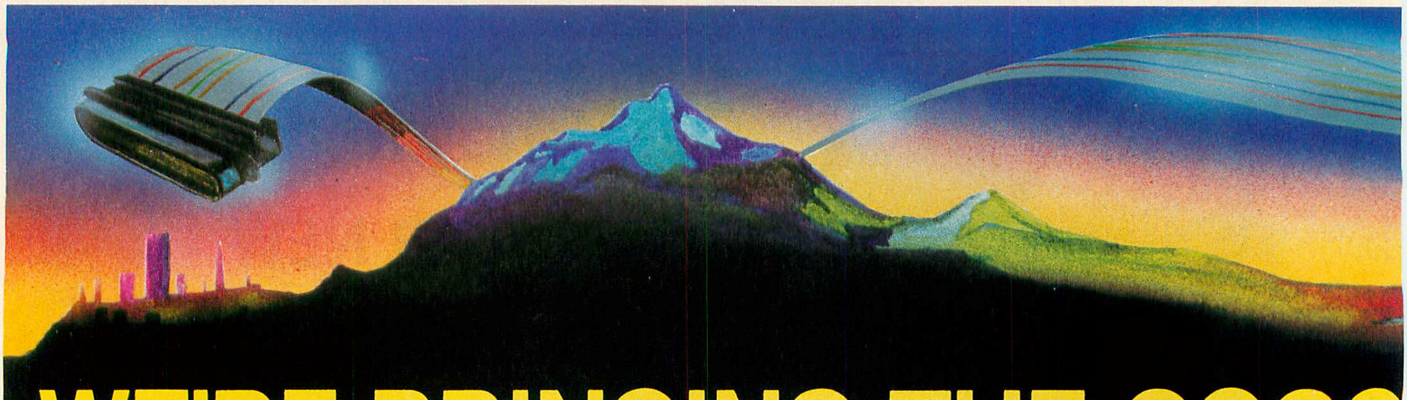
COMPUTERWARE® **(619) 436-3512**
Box 668 • Encinitas, CA • 92024

Name ____________________
Address ____________________
City ____________ State ______ Zip ______
Yes! Send me your FREE catalog! **CoCo** ☐
VISA MasterCard
Card # ____________ Exp. ______
Signature ____________________

Item	Format	Price

Shipping
Surface — $2 minimum.
2% for orders over $100
Air or Canada — $5 minimum.
5% for orders over $100
Checks are delayed for bank clearance

6% Calif. Sales Tax ______
COD Add $5 ______
Shipping* ______
TOTAL ______



WE'RE BRINGING THE COCO

RAINBOW'S BROADENING ITS SPECTRUM

THE RAINBOW and the Delphi Information Utility have joined together to allow CoCo owners all over the world to connect with one another!

Delphi is a full-service information utility. It offers everything from up-to-the-minute news stories from The Associated Press to electronic mail services. But, *best of all*, it now has **a special forum for Color Computer owners, and it's operated by the people who bring you THE RAINBOW each month.**

The CoCo Special Interest Group (SIG) features a variety of services, including an open forum where you can send and receive messages from Color Computer owners all over the world. It also has several databases to which you can upload your favorite programs and from which you can download programs written by other CoCo enthusiasts. Some of these databases are BASIC programming, OS-9 and home applications.

When setting up your account with Delphi, if you do not have a credit card or prefer not to use it, Delphi requires that you send $20 to give your account a positive balance. This will be refunded after your first free hour if you choose to no longer use the system or it will be applied to future connect charges. If you do not maintain a positive balance, you will be charged $3.50 each month for direct billing.

PEEK INTO THE RAINBOW

The CoCo SIG's conference feature allows you to meet electronically with other members of the CoCo Community. You can join conferences with notables such as Dale Puckett, Cray Augsburg, Marty Goodman, Don Hutchison, Jim Reed, Lonnie Falk and others — on a regular basis. Conference schedules will appear in THE RAINBOW each month. Be sure to check online announcements for changes and additions.

THE OTHER SIDE OF THE RAINBOW

On Delphi, you also are able to buy RAINBOW ON TAPE — order a whole set, or download an individual program immediately. You can also renew your RAINBOW subscription, make a fast and easy order for software or hardware from a multitude of vendors, or inquire about products on the CoCo SIG.

We also have a number of **programs that you can download** and use, just for the cost of the time you spend transferring them. There'll also be **corrections for RAINBOW articles**, helpful hints and many other useful features.

FREE LIFETIME MEMBERSHIP

THE RAINBOW is offering subscribers a free lifetime subscription to Delphi — a $24.95 value — and a free hour of connect time — a $7.20 value at either 300, 1200 or 2400 Baud — so you can sample Delphi and the RAINBOW CoCo SIG. That's right. Your subscription to THE RAINBOW entitles you to this $32.15 value as a ***free bonus!***

If you're not a RAINBOW subscriber, just enter your order when you sign on with Delphi and you'll get the same great deal! For our $31 subscription fee, you'll get the finest Color Computer magazine ever, a free lifetime subscription to Delphi and a free hour of connect time.

SAVE EVEN MORE

Want to save even more? While you're online you can order, for only $29.95, a deluxe package which includes the Delphi membership, the *Delphi Handbook and Command Card* ($21.95) and a total of three hours of connect time ($21.60).

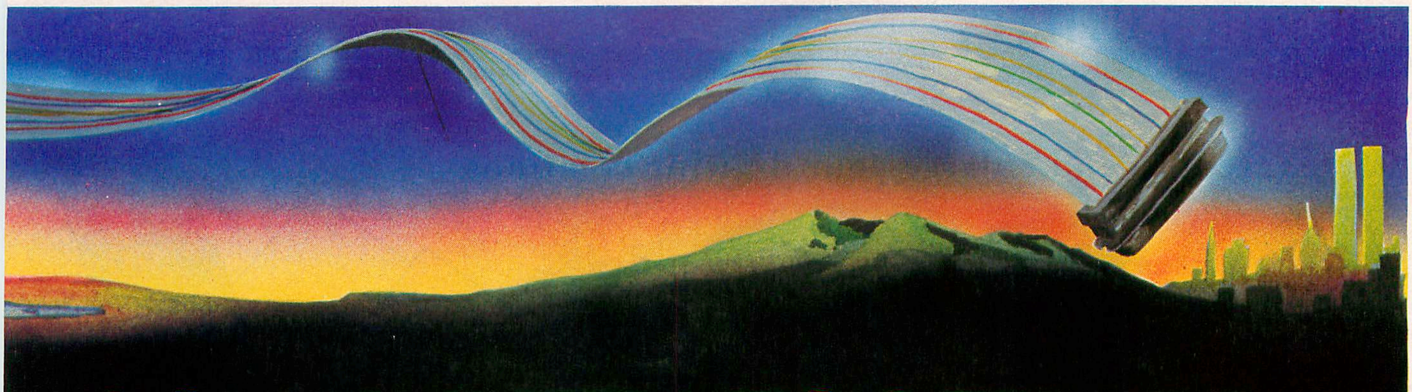
Delphi provides us all with **Immediate CoCo Community**. Check it out today. After all, you can sample it for free!

Problems? Call Delphi:

(800) 544-4005

(617) 491-3393

DELPHI TYPE: GROUP COCO



COMMUNITY TOGETHER

How to reach RAINBOW's Color Computer SIG . . .

There are several ways to connect to Delphi and THE RAINBOW's CoCo SIG. In most cities you will not even have to pay long distance charges; you can use special data communications networks like Uninet, Tymnet and the Canadian Datapac network.

First, set your terminal program to operate at either 300 or 1200 Baud (depending on the modem you have), and also select either 7 bits with even parity or 8 bits with no parity, and one stop bit. (If one combination doesn't work, try another.)

Decide which network you should use. There is no surcharge for Uninet or Tymnet. Canadian residents using Datapac will be charged an additional $12 (U.S.) per hour.

On Uninet: Call (800) 821-5340 to get the Uninet number for your area. After you call the appropriate number for your own area and make connection, you'll see a prompt of "L?" Press ENTER, the period key (.) and ENTER again. At the "service:" prompt, type `GVC` (for General Videotex Corporation) and ENTER.

On Tymnet: Call (800) 336-0149 to get the Tymnet number for your area. After you dial your designated number and connect, you will see either "garbage" or a message saying "please type your terminal identifier." At this point, even if the screen is garbled, simply press 'A'. When "please log in:" appears, type `DELPHI` and press ENTER.

From Canada (on Datapac): Call Delphi Customer Service at (617) 491-3393 to get the Datapac number for your area. After you connect, press the period key (.) and ENTER (use two periods if you're using 1200 Baud). Type `SET 2:1, 3:126` and press ENTER. Now type `p 1 3106, DELPHI;` and press ENTER. Delphi's new rates indicate an additional $12 hourly surcharge for evening use of Datapac, which means a total of $18 (U.S.) for connect time.

From other countries: Many countries have their own data networks that can connect to either Uninet or Tymnet. Check with the telephone authorities in your country for details on how to sign up for this service. When you have an account set up, you can reach Delphi with a "host code" of 312561703088 through Uninet, or 310600601500 through Tymnet. (You'll have to pay the toll charges for this connection.)

Type in Your Username

If you're already a subscriber to THE RAINBOW, at the "USERNAME:" prompt, type `RAINBOWSUB` and press ENTER. At the "PASSWORD:" prompt, type your individual subscription number from the mailing label of your latest issue of THE RAINBOW. (If there are one or more zeros at the beginning of this number, include them.)

If you don't already have a subscription, at the "USERNAME:" prompt, type `RAINBOWORDER` and press ENTER. At the "PASSWORD:" prompt, type `SENDSUB` and press ENTER. Have your MasterCard, VISA or American Express card ready, because you'll be led through a series of questions that will enable us to put your RAINBOW and Delphi subscriptions into effect. In an effort to hold down non-editorial costs, we do not bill for subscriptions.

If you make a typing error, just press `ENTER` and start over. Remember that at any point, when you're on Delphi, you can type `HELP` to get help on how to use the system. To get off the system just type `BYE`.

If you find that you're unable to log on to Delphi and enter the CoCo SIG after following these instructions, call us during afternoon business hours at (502) 228-4492. We'll be glad to offer assistance.

Come Visit Us! Type: `GROUP COCO`

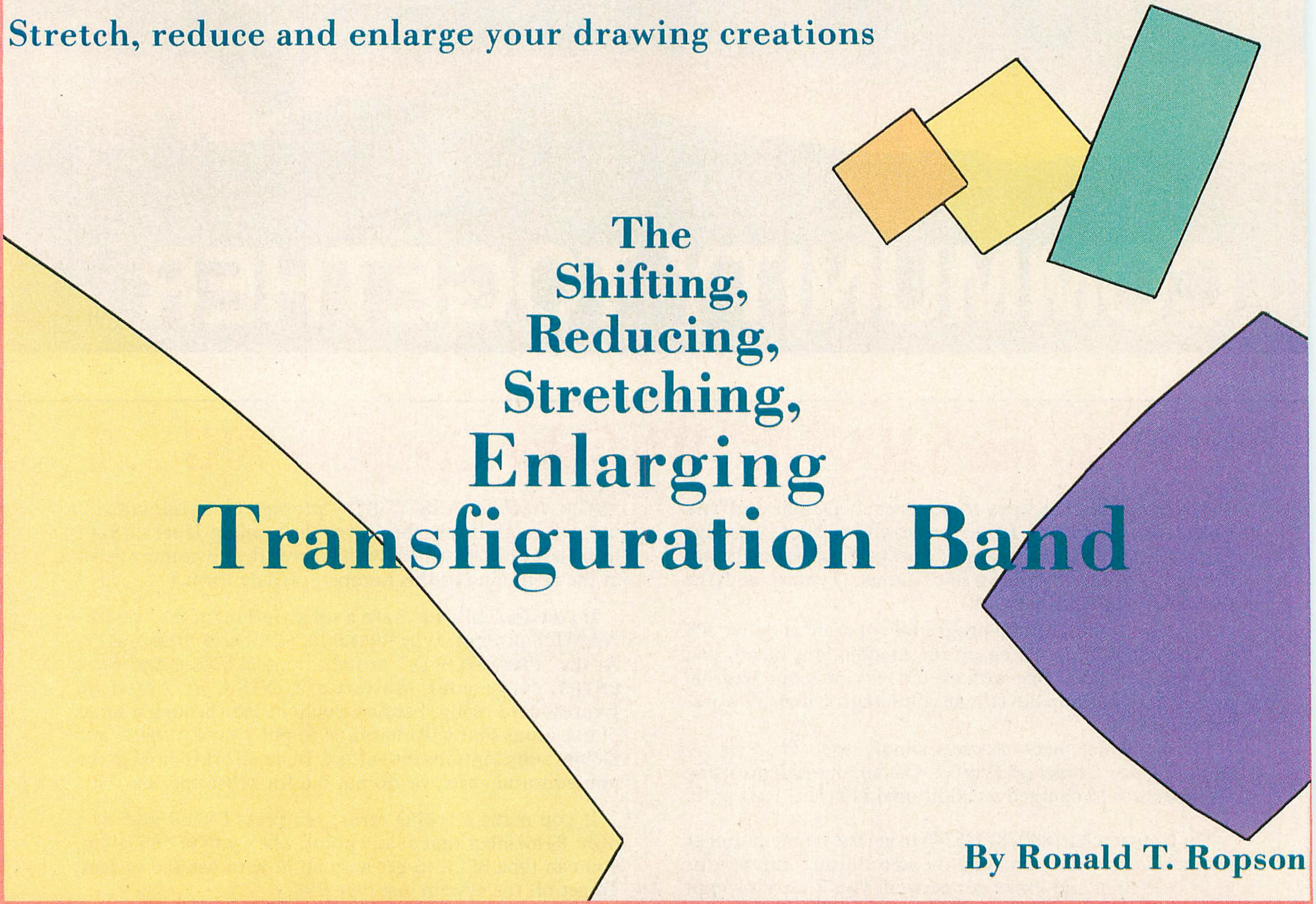
After you sign in, you'll be prompted to set up your own, personal "user name" — Delphi is a friendly service, no numbers to remember — and you'll be asked a number of questions so Delphi can set up your account. You'll also be assigned a temporary password. No time is assessed against your free hour of service while you answer these questions.

Delphi will tell you that your account will be ready after 6 p.m. the same day if you sign up before noon (Eastern time zone.) If not, your account will be ready at 6 p.m. the next day. Once an account is opened, *each RAINBOW subscriber will be credited with an hour of free time!*

When you log back in, use your chosen username and your temporary password to access the system. At that point, you will meet Max, who will help you configure things and will change your temporary password into your own *personal* password. This is the password you will use for subsequent sessions — or until you change it.

After Max bids you goodbye, you'll wind up at the Delphi Main Menu; type in `GROUP COCO` and **join us on the CoCo SIG!**

Stretch, reduce and enlarge your drawing creations



The Shifting, Reducing, Stretching, Enlarging Transfiguration Band

By Ronald T. Ropson

For those of you who love playing with graphics, here's a simple, short and almost infinitely versatile program.

Using *Zoom-Stretch* you can change a small image to a larger image or vice versa. But you can also stretch or squeeze the image like Silly Putty. Does that sound like what you've been waiting for? Well, start typing.

Listing 1 shows the main program in a simple menu format. It is self prompting and uses eight graphics pages. The original rectangle will be taken from the image in `PMODE 4,1` and OR-ed with the image in `PMODE 4,5` (within the rectangle specified).

First, draw or load the original image to `PMODE 4,1`. Determine what part of that image you would like to transfer to the destination screen using the top left (X1,Y1) and bottom right (X2,Y2) coordinates (they must be entered in that order). Next, determine where and what size the end result will be on the destination screen in the same manner (X3,Y3) (X4,Y4).

Load and run *Zoom-Stretch*. When the menu appears, you may want to clear the destination screen (unless you are adding to what's already there). Next enter *Zoom-Stretch* Mode 1. The computer asks for the origin and destination coordinates. Enter them as instructed and watch the CoCo do its work. Press any key to return to the menu. It's as simple as that.

To help you understand how it works and to show some examples of the variety of possibilities of this program, I have included three modifications which use *Zoom-Stretch* to create interesting graphics effects.

Listing 2 is a modification which draws a flower on the origin screen (`PMODE 4,1`) and deposits 12 flowers of various sizes onto the destination screen (`PMODE 4,5`) to produce a pretty flowered pattern on the screen. Add these lines to the original program as shown. When run, this starts producing the flower pattern, then returns to the menu. Enter, save, then run it and see it do its stuff.

Listing 3 is another modification to Listing 1. This one draws five-pointed stars of decreasing size on the destination screen from one star drawn on the origin screen.

Listing 4, another modification, draws the word "RAINBOW" on the origin screen and stretches and squeezes the letters onto the destination screen. This illustrates the Silly Putty effect.

If you like to work with machine language, run *Zoom-Stretch* and save the machine language to shorten the program. The ML routine is fully position independent. The value of PC and the cleared memory area must be changed to accommodate the new position.

Ron Ropson lives in Green Bay, Wisconsin and is a fabrication manager for a plastics shop. He has independently studied machine language and hopes to make a career of programming and/or photography.

Run the program and enter `CSAVEM"ZOOM/ML",PC+16,PC+186,PC+26`. Delete the data statements and change Line 15 to read `15 CLOADM"ZOOM/ML"`. If you have a disk system, change `CSAVEM` to `SAVEM` and `CLOADM` to `LOADM`. If you don't understand machine language, don't worry. Just type in the program as it is and don't change anything.

Does this give you ideas or new possibilities? Maybe you can load the latest drawings of your friends and stretch them a bit. How about wallpaper patterns with more variety? You are limited only by your imagination and 49,152 pixels. Have fun!

(Questions may be directed to the author at 1223 Michaline Drive, Green Bay, WI 54304, 414-499-2195. Please enclose an SASE when writing.) ☐

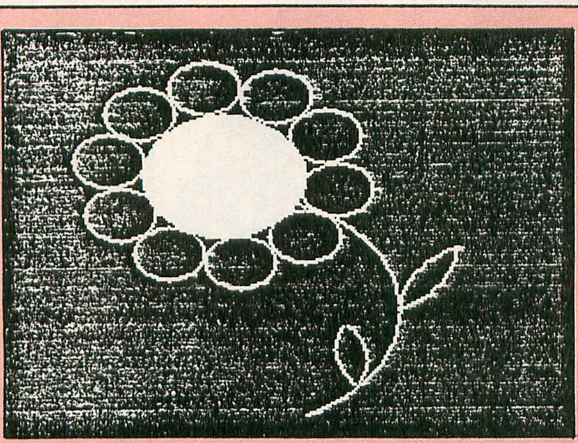


Figure 1: Origin Screen

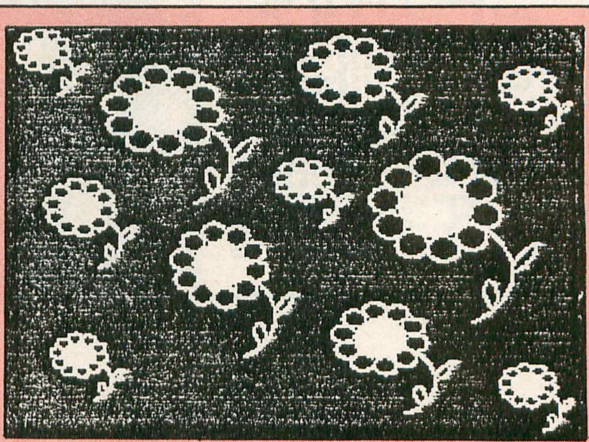


Figure 2: Destination Screen

Listing 1: `ZOOM1`

```
0 'ZOOM/STRETCH,1985 BY RON ROPS
ON
5 PCLEAR8:PMODE4,5:CLEAR200,&H7F
00
10 PC=&H7F01
15 FORA=PC+16 TO PC+186:READB$:P
OKEA,VAL("&H"+B$):NEXTA
20 DATA 80,40,20,10,8,4,2,1,0,0,
31,8C,F3,5F,B6,0,19,83,18,0,1F,3
,83,18,0,1F,1,A6,32,C6,20,3D,30,
8B,A6,3E,A7,3A,C6,20,3D,33,CB,A6
,30,E6,3C,E7,38,ED,28,8D,28,A6,3
E,A1,3A,27,F,8D,20,A6,3E,A1,3F,2
7
25 DATA 67,6C,3E,33,C8,20,20,EB,
A6,32,A1,33,27,5A,6C,32,30,88,20
,EC,36,E3,3A,ED,3A,20,D6,5F,A6,2
8,A7,30,A6,29,A7,3C,ED,38,8D,22,
A6,3C,A1,38,27,C,8D,1A,A6,3C,A1
30 DATA 3D,27,32,6C,3C,20,EE,A6,
30,A1,31,27,28,6C,30,EC,34,E3,38
,ED,38,20,DC,A6,30,1F,89,44,44,4
4,C4,7,E6,A5,E4,86,27,F,A6,3C,1F
,89,44,44,44,C4,7,E6,A5,EA,C6,E7
,C6,39
45 GOTO100
50 A$=INKEY$:IFA$=""THEN50ELSERE
TURN
100 CLS:PRINT@13,"MENUE","<1> ZO
OM/STRETCH","<2> CLEAR DEST. SCR
EEN","<3> VIEW ORIGIN SCREEN","<
4> VIEW DESTINATION SCREEN","<5>
 TRANSFER DEST TO ORIG":INPUTA:O
NA GOSUB200,300,400,500,600
110 GOSUB50:GOTO100
200 CLS:INPUT"ORIGINAL RECTANGLE
: X1,Y1,X2,Y2";X1,Y1,X2,Y2
210 IFX1>255ORY1>191ORX2>255ORY2
>191THEN200
220 INPUT"DESTINATION RECTANGLE:
 X1,Y1,X2,Y2";X3,Y3,X4,Y4
230 IFX3>255ORY3>191ORX4>255ORY4
>191THEN220
240 RH=(X4-X3)/(X2-X1):H2=(RH-IN
T(RH))*256:RV=(Y4-Y3)/(Y2-Y1):V2
=(RV-INT(RV))*256
250 POKEPC,X1:POKEPC+1,X2:POKEPC
+2,Y1:POKEPC+3,Y2:POKEPC+4,RH:PO
KEPC+5,H2:POKEPC+6,RV:POKEPC+7,V
2:POKEPC+12,X3:POKEPC+13,X4:POKE
PC+14,Y3:POKEPC+15,Y4
260 PMODE4,5:SCREEN1,1:EXEC(PC+2
6):RETURN
300 PMODE4,5:SCREEN1,1:PCLS0:RET
URN
400 PMODE4,1:SCREEN1,1:RETURN
500 PMODE4,5:SCREEN1,1:RETURN
600 PMODE4,1:SCREEN1,1:FORA=1TO4
:PCOPY (A+4) TO (A):NEXTA:GOTO40
0
```

Listing 2: `ZOOM2`

```
45 GOSUB2000:GOTO100
2000 GOSUB400:PCLS0
2005 'DRAW FLOWER
2010 CIRCLE(100,70),36,,.75:PAIN
T(100,70),1,1
2020 FORT=.15TO6.29STEP.6283:X=5
0*SIN(T)+100:Y=37.5*COS(T)+70:CI
RCLE(X,Y),16,,.75:NEXTT
```

NEW

OWL-WARE

WINCHESTER BASIC

ANNOUNCING... the Development of a Major Breakthrough in HARD DRIVE SYSTEMS for the COLOR COMPUTER!!!

Several months ago OWL-WARE introduced the Finest OS9 Hard Drive System for the Color Computer. Now we are about to introduce the only RSDOS Interface System worthy of our computer, OWL-WARE Winchester Basic. For the first time you have available a true Winchester System, although there are 10 directories made available to BASIC, the only limit to size of any file is the size of your drive. On a 10 meg drive you could have a 8 meg file on directory 5 and a 1 meg file on directory 8 and small files everywhere. You turn the computer on and you can immediately access your drive from BASIC or any language using commands you already know. You do not have to know or use OS9 to use OWL-WARE WINCHESTER BASIC, but if you do, all files saved from RSDOS are available to OS9. All files generated from OS9 can be made available to RSDOS by copying to the WINCHESTER BASIC directories. There are no partitions to wall you into, only one operating system, but nothing forces you to use an operating system you don't like.

Call for further details and availability on this breakthrough product!!!

Prices WITH DRIVE BELOW ONLY... **$50.** WITHOUT DRIVE **$75.**

OS-9 HARD DRIVE SYSTEMS

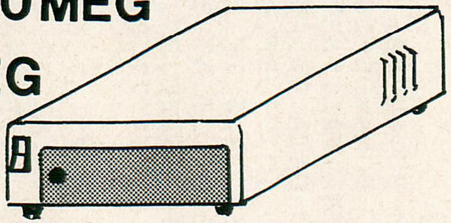
Disk Access is at Least... ***8 Times Faster than Floppy Drives.***

Control up to 2 Drives. EACH with Continuous Massive Memory!!! Complete OS-9 Hard Drive System Includes... Software, Hard Drive, Controller and L.R. Tech Interface.

NOTE: OS-9 and RS DOS... "This may prove to be the perfect mating of both systems." RAINBOW (May 86)

$525. **5MEG** **$659.** **10MEG**

$799. **20MEG**



Interface & Software Only **$119.**

NOTE: Interface is not Interrupt Driven Like Our Competition. Therefore, the System Clock does not Lose Time During Hard Drive Access.

INSTALL IN ANY SLOT OF MULTI-PAK OR USE Y CABLE.

OWL-WARE is pleased to announce an exclusive arrangement to Distribute the L.R. TECH Hard Drive Interface and Software.

DEALERS INQUIRES INVITED

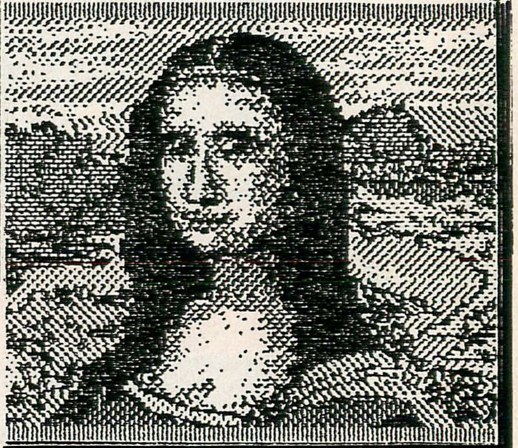
CREATE BEAUTIFUL PICTURES WITH

MASTER ARTIST

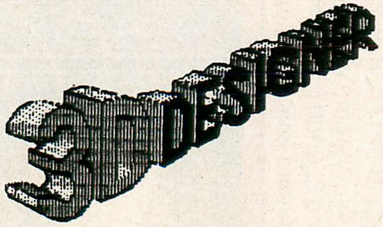
vers. 2.0

- Convenient, on-screen menu
- Accepts input from X-PAD, TOUCH-PAD, MOUSE or JOYSTICK
- Magnification mode
- Draw with custom paintbrushes
- Easy free-hand sketching
- "Paint" command
- 10 colors at a time
- Pictures are ready for use in BASIC programs
- Lettering in any size
- Screen dump to Color Ink-Jet or other Tandy printers

64K DISK $29.95



VIEW 3-DIMENSIONAL OBJECTS FROM ANY ANGLE WITH



- convenient, on-screen menu
- Supports input from X-PAD, TOUCH-PAD, MOUSE or JOYSTICK
- Built-in screen dump to Tandy printers
- Calculates dimensions for you from just a rough sketch
- Plots or calculates lines and arcs
- On-screen sketching mode

64K DISK $29.95

OWL-WARE'S TOLL FREE ORDER LINE (800) 245-6228

DISK DRIVES

TECHNICAL ADVICE
(215) 682-6855

All Prices Include Case and Power Supply

SHhhh... Ask about the WISPER DRIVE!!!

DRIVE 0 $179. to $239.

...Call for SPECIAL PRICES on Drive 0,1,2,3 Combos.

DRIVE 1 $99. to $145.

Single
Double
Quad

All drives are new and fully assembled. We ship *FULLY TESTED and CERTIFIED DRIVES at NO ADDED CHARGE!*

CHINON and Other Brands known as the highest quality made.

STATE-OF-THE-ART
TECHNOLOGY

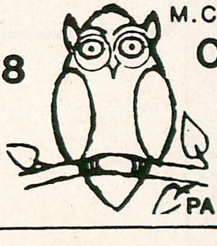
See Special Bundled Software with Disk Drive Purchase!

We have RSDOS, JDOS, OWL DOS, ADOS available on ROM. Call about Double Sided or Special Needs.

WARRANTIES
90 day - 1 YEAR

TOLL FREE ORDER LINE
(800) 245-6228

Call for
LATEST
PRICES!!!



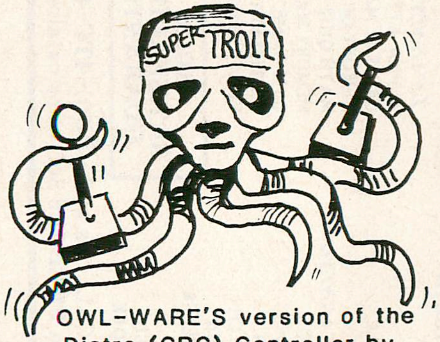
M.C. & VISA Accepted

OWL-WARE
P.O. Box 116-D
Mertztown, PA.
19539

PA Res Include 6% Tax
PA (215) 682-6855

NOW AVAILABLE !!!

SUPER-TROLL



OWL-WARE'S version of the Distro (CRC) Controller by Tony DiStefano. This has sockets for 4 ROM Chips. ...only $15.00

NOTE: Each option, only available with option listed above it.

ADD ON OPTIONS:

CDOS	$6.
Parallel Printer Port	$25.
Real Time Clock	$10.
80 Column Card	$65.

Just Controller $99. with CDOS to $195. with ALL options

OWL TIP:

If you compare price to value, OWL-WARE always has the best price!!!

OWL-WARE SOFTWARE

BUNDLE: DISK TUTORIAL
2 UTILITIES
2 GAMES

DISK TUTOR

LEARN EVERYTHING ABOUT DISK BASIC FROM THIS MACHINE LANGUAGE PROGRAM. THE TUTOR TAKES YOU STEP BY STEP THROUGH THE LESSONS AND CORRECTS YOUR MISTAKES A MULTI-LESSON TUTORIAL THAT WILL GIVE YOU QUICK, PAINLESS KNOWLEDGE OF DISK BASIC (THIS PROFESSIONALLY WRITTEN TUTOR IS EASILY WORTH THE BUNDLE'S TOTAL PRICE).

OWL DOS

AN OPERATING SYSTEM THAT GIVES 25% FASTER DISK ACCESS AND ALLOWS USE OF DOUBLE SIDED DRIVES. CORRECTS FLOATING POINT NUMBER ERROR.

COPY-IT

QUICKLY COPIES SELECTED PROGRAMS FROM DISK. USE WILD CARD OPTION SEARCH TO SELECT GROUPS OF PROGRAMS FOR COPY (NOT FOR PROTECTED PROGRAMS)

2 GAMES

2 GAMES FROM OUR STOCK.
BOTH HAVE SOLD FOR OVER $17. EACH.

IF SOLD SEPARATELY OVER $125.00 WORTH OF SOFTWARE!!!

only $24.95!!!
(or even better)
$4.95 with
DISK DRIVE PURCHASE!!!

```
2030 CIRCLE(110,128),66,,.75,.75
,.2
2040 CIRCLE(215,128),40,,.75,.5,
.7
2050 CIRCLE(160,101),40,,.75,0,.
2
2060 CIRCLE(132,150),30,,.75,.88
,.08
2070 CIRCLE(177,145),30,,.75,.38
,.58
2090 'COPY FLOWERS TO SCREEN
2100 GOSUB300:FORA=1TO12:X1=0:Y1
=0:X2=255:Y2=191:READX3,Y3,X4,Y4
:GOSUB240:NEXTA:GOSUB50:RETURN
2110 DATA0,0,48,36,32,12,132,87,
118,0,198,60,208,16,255,52,12,64
,72,112,144,48,255,140,112,56,16
0,92,64,80,144,152,16,132,64,168
,132,116,212,176,208,144,255,180
,84,156,132,191
```

Listing 3: ZOOM3

```
45 GOSUB3000:GOTO100
3000 GOSUB400:PCLS0'5STAR
3010 C=1:X=128:Y=5:FORT=0TO6.3ST
EP.6283:A=X:B=Y:X=128-SIN(T)*121
*C:Y=96-COS(T)*91*C
3020 IFC=1THENC=.39ELSEC=1
3030 LINE(A,B)-(X,Y),PSET:NEXTT
3040 GOSUB300:FORA=0TO100STEP25:
X1=0:Y1=0:X2=255:Y2=191:X3=A:Y3=
A*.75:X4=255-X3:Y4=191-Y3:GOSUB2
40:NEXTA:GOSUB50:RETURN
```

Listing 4: ZOOM4

```
45 GOSUB4000:GOTO100
4000 GOSUB400:PCLS0'RAINBOW
4010 DRAW"BM32,106U20R10D10L10F1
0BR12U20R10D10NL10D10BR12R5NR5U2
0L5R10BR12ND20F20U20BR12ND20R10D
8G2L8R8F2D8L10"
4020 CIRCLE(162,96),11
4030 LINE(182,86)-(192,106),PSET
:LINE-(202,86),PSET:LINE-(212,10
6),PSET:LINE-(222,86),PSET
4040 GOSUB300:FORA=1TO11:X1=16:Y
1=85:X2=240:Y2=107:READX3,Y3,X4,
Y4:GOSUB240:NEXTA:GOSUB50:RETURN
4050 DATA0,10,255,18,0,30,255,90
,0,100,128,120,128,100,255,120,0
,130,85,160,85,130,160,160,160,1
30,255,160,0,170,64,180,64,170,1
28,180,128,170,192,180,192,170,2
55,180
```

TCE's 5th Anniversary Catalog is now available!

IF YOU OWN A TANDY COMPUTER THERE'S SOMETHING FOR YOU!

PROGRAMMING TOOLS
DEFT PASCAL WORKBENCH
DEFT EXTRA
DEFT 3D GRAPHICS SAMPLER

WORD PROCESSING
CHILD WRITER
MEMO WRITER
BUSINESS WRITER

DATA MANAGERS
CHILD FILER
LIST MANAGER
BUSINESS MANAGER

SPREADSHEETS
CHILD CALC
SIMPLE CALC
BUSINESS CALC

EARLY LEARNING
ABC's IN COLOR
ALPHA MEMORY
HAPPY COUNT
MIX AND MATCH
MR. BEAR COUNT
MR. BEAR SPELLER
MR. PIGGY
SEE AND SPELL
TEACHING CLOCK

MATH SERIES
BASIC MATH
CRISS CROSS MATH
CRISS CROSS PLUS
FLASH CARD
FRACTIONS
FRACTION DESTROYER
FRIEND OR FOE
MATH BOMBER
MATH REVIEW
MR. BEAR FLASH CARD
MR. BEAR MATH
PLACE VALUES
REDUCING FRACTIONS
RESCUE MATH

LEARNING ACTIVITIES
ALPHA ATTACK
CAPITAL MATCH
HISTORY QUIZ
MATH QUIZ
MEMORY MATCH
QUIZ GAME
UNITED STATES
VOCAB BRUSH-UP

LANGUAGE ARTS
ALPHABETIZE
ANTONYM EXPRESS
ANTONYM MATCH
COMPUTER EASE
CRISS CROSS SPELL
ENGLISH REVIEW
HOMONYMS
NOUNS
NOUNS REVIEW
PLURALS
PRONOUNS
SAVE THE FISH
SPELL BOMBER
SPELLING RULES
SUPER SPELL BOMBER
SYNONYM EXPRESS
SYNONYM MATCH
TORPEDO SCRAMBLE
VERB REVIEW
WEEKLY SCRAMBLER
WEEKLY SPELLER

100% SATISFACTION GUARANTEE

TCE

CALL us at 1-(800)-4TC-4TCE or 1-(301)-963-3848
for a **FREE** TCE Software catalog and the latest copy of TCE NEWS.

32K
ECB

Portraits by BASIC

By
Ann B.
Mayeux

Whose face will you draw? With *Draw Face*, you can draw your friends, a clown, a vampire, a baby and any other face you can imagine. It's easy.

Using single-key selections, choose face shape, ears, hairstyle, eyes, eyebrows, mouth, nose, accessories and other features such as beard, glasses, or vampire cape. To make a selection, press the letter for the option wanted.

To help you, a box in the upper right-hand corner tells which feature you need to choose. If you cannot remember the options, pressing the slash (/) brings up a list of the letters to use and a brief description (see Figure).

Menu Options

Shape
B - Baby
C - Cadaverous
L - Long
O - Oval
R - Round
S - Square

Ears
B - Big
E - Normal ears
L - Little
N - No ears
S - Pointy

Hair
A - Afro
B - Boy's
C - Curly
D - Dutch boy
H - Hair
I - Curly infant
L - Long
M - Middle part
N - No hair
O - Old fringe
P - Pony tail
R - Red fringe
S - Girl's short
W - Widow's peak

Eyes
B - Big
C - Closed
E - Open eyes
I - Little
L - Eyes with lashes
M - Mad
O - Sleepy open
S - Surprised
T - Tired

Eyebrows
A - Arched
B - Bushy
C - Clown
I - Infant
M - Mad
N - None
Q - Quizzical
S - Surprised
T - Tilted

Mouth
B - Big
C - Clown
H - Happy
I - Infant rosebud
L - Lipstick
M - Straight mouth
O - Open
S - Sad
T - Teeth
V - Vampire

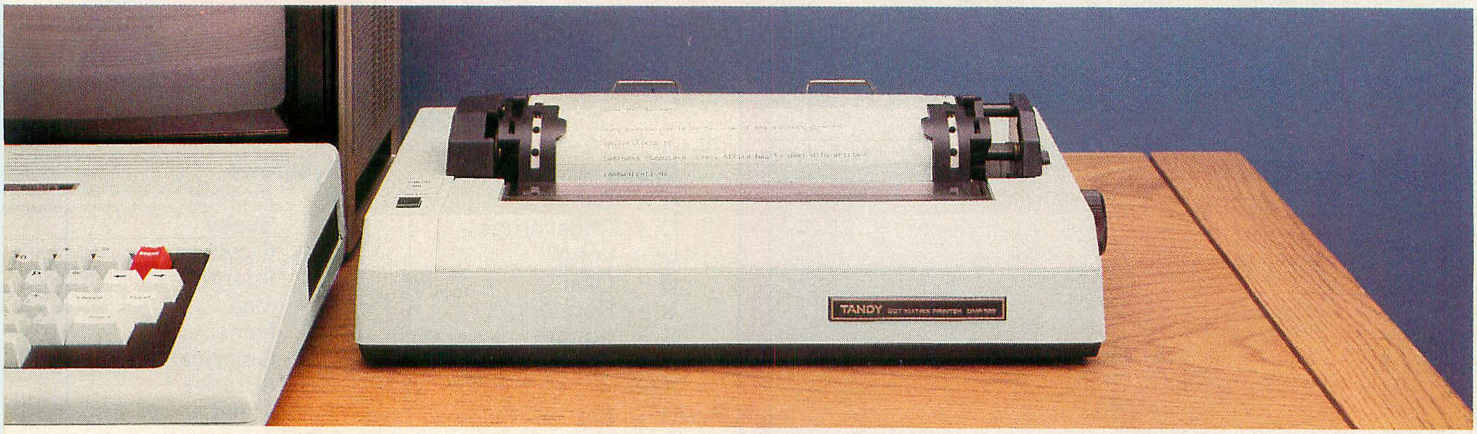
Nose
C - Clown
I - Infant
N - Narrow
P - Pug
S - Straight
W - Wide

Accessories
B - Beard
C - Cheeks
E - Earrings
F - Frown
G - Glasses
H - Hat
M - Mustache
N - Neckline
R - Hair bow
S - Shirt
T - Bow tie
V - Vampire's cape

Ann Mayeux takes time from the computer to care for her two small boys and husband. She has a degree in psychology and taught herself programming from the CoCo manual and THE RAINBOW. Ann writes Adventure games and programs for her sons.

Next to your Tandy® or

Radio Shack
TRS-80
DMP 430



nothing beats a

High-quality printers—at hard-to-beat prices!

Now that you have the home or office computer you wanted, get the printer you need. A Tandy printer!

Tandy printers are designed to give you exceptional print quality, graphics and high performance—all at affordable prices. Your nearby Radio Shack Computer Center has a complete line of printers, from high-speed dot matrix to letter-quality daisy wheels. There's sure to be one that will suit your particular printing requirements—and budget—to a tee.

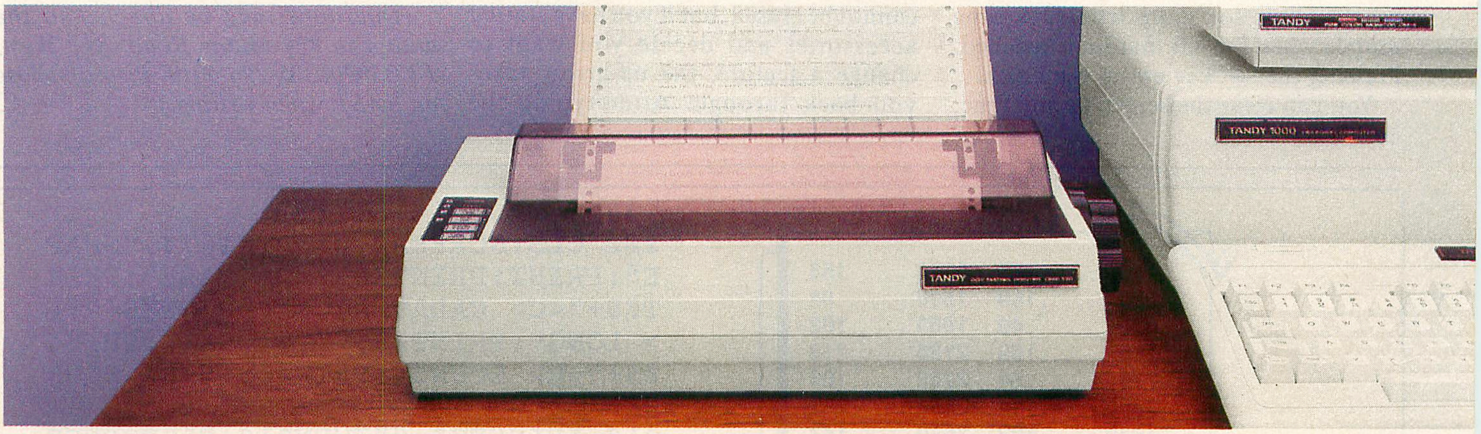
Budget-priced high performer

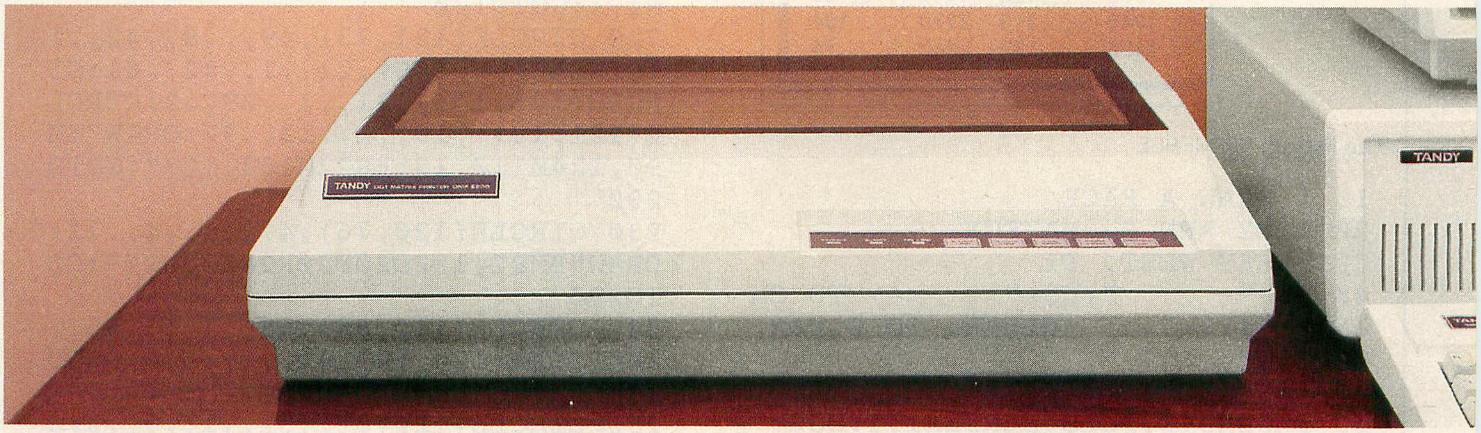
The DMP 105 (26-1276, $199.95) is the low-cost solution for data-processing and general-purpose use. The DMP 105 features a bidirectional head that prints 80 characters per line at 43 lines per minute (10 cpi). Elongated and condensed modes are also available. Prints up to 80 characters per second. Parallel and Color Computer-compatible serial interfaces.

Triple-mode "personal printer"

The low-cost, versatile DMP 130 (26-1280, $349.95) features word-processing and data-processing, as well as dot-addressable graphics modes. You can choose from four character styles: standard or italic cursive, in draft or correspondence modes. The DMP 130 supports super/subscripts, double-width, bold, double-strike and micro-fonts. The bidirectional, logic-seeking print head prints original, plus two copies on 4″ to 10″ fanfold paper or single sheets. Prints up to 100 characters per second. Built-in tractor. Parallel and Color Computer-compatible serial interfaces. IBM® PC compatible.

PC-compatible computer,





Tandy printer.

Low-cost business printer

The DMP 430 (26-1277, $699.00) is a dot-matrix printer with an 18-wire print head that delivers superior correspondence fonts in a single pass. Prints 10, 12, or 16.7 cpi, plus elongated, standard, elite and condensed. You can also get micro, italic and double-high fonts. Prints original, plus two copies at 180 characters per second. IBM PC compatible.

Power for business

Get high speed and high performance with our finest printer, the DMP 2200 (26-1279, $1695.00). Efficient, fast printing means no long and costly delays for reports. Supports elongated, double-high, bold, underline, super/subscripts, italics and double-strike modes, plus bit-image graphics. Prints up to 380 characters per second. Features a true pin-driven tractor—not sprocket. Prints original, plus up to six copies. Parallel interface only. IBM PC compatible.

**In Business . . .
for Business**

For the best value and selection in printers, shop Radio Shack. We've got the right match for your machine!

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

Send me an RSC-17 Computer Catalog.

Mail to: Radio Shack, Dept. 87-A-704
300 One Tandy Center
Fort Worth, Texas 76102

Name ____________________
Company ____________________
____
Address ____________________
City ____________________
State ____________________
ZIP ____________________
Phone ____________________

Prices apply at Radio Shack Computer Centers and at participating stores and dealers. The DMP 430 may require special order. IBM/Registered TM International Business Machines Corp.

After your picture is the way you want it, press the '@' key and type in a name across the bottom of the screen. If the name is five or six characters long, it will be centered. Push the left-arrow key to allow for more letters. A tone sounds when the left margin is reached. Pressing the '@' key erases the name.

You can clear the screen at any time, and once ears are selected, the features can be changed by pushing the up-arrow. Repeatedly pressing the up-arrow erases previous features in turn, except the face shape. Accessories cannot be erased, but if you have started accessories and decide you want to change a feature, the up-arrow takes you back through. After typing the name, the up-arrow takes you back to accessories, although the box in the corner does not reappear.

After enjoying your picture, clear the screen and begin again.

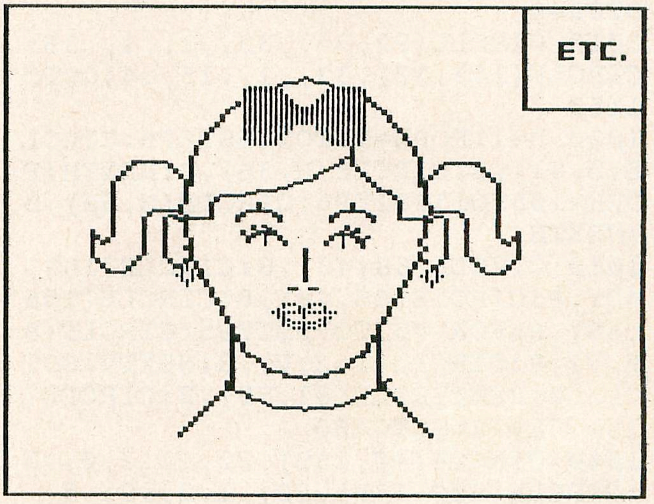
(Questions may be directed to the author at 874 Maine Road, Key West, FL 33040, 305-296-6019. Please enclose an SASE when writing.) ☐

150	161	1640	153
260	169	1810	94
420	49	1960	162
560	189	2120	213
770	64	2260	105
930	154	2460	227
1040	103	2570	142
1130	122	2690	30
1340	213	2770	194
1450	191	END	14

The listing: DRAWFACE

```
10 ' DRAW A FACE
20 ' BY ANN B. MAYEUX
30 ' KEY WEST, FL
40 Z$="        ":U$="     <^> TO CH
ANGE ":Y$="    <CLEAR> TO CLEAR
SCREEN"
50 '*SHAPE
60 PMODE3,1:PCLS:SCREEN1,1:MG$="
BM5,0R245D190L245U190R200D40R45"
:DRAWMG$
70 DRAW"BM20,20U10R5F2D6G2L5BR13
U10R6F2DG2L6R5F3D2BR6U6E4F4DNL8D
5BR7NU10E4NUF4NU10BR20U6E4F4DNL8
D5BR20U10NR7D5NR5D5BR13U6E4F4DNL
8D5BR15BU2G2L4H2U6E2R4NF2BR9NR7D
5NR5D5R7":GOTO90
80 LINE(209,3)-(248,38),PRESET,B
F:RETURN
90 DRAW"BM210,9R3U3L3U3R3;BR4D6U
3R4U3D6;BR4U4E2F2DNL4D3;BR4U6R4D
3L4D3;BR8U6R3BD3L3D3R3":CIRCLE(2
26,20),10,,.8,.41,.1:DRAW"BM218,
24F3D4F3R5E3U4E2U"
100 A$=INKEY$:IFA$=""THEN100 ELS
E LINE(10,10)-(200,30),PRESET,BF
110 IFA$="C"THENF=1:GOTO230
120 IFA$="O"THENF=2:GOTO270
130 IFA$="L"THENF=3:GOTO240
140 IFA$="R"THENF=4:GOTO250
150 IFA$="S"THENF=5:GOTO260
160 IFA$="B"THENF=6:GOTO220
170 IFA$="/"THEN200
180 GOTO100
190 ON F GOTO230,270,240,250,260
,220
200 CLS:SCREEN0,0:PRINT@74,"SHAP
E":PRINT:PRINTZ$+"<B> BABY":PRIN
TZ$+"<C> CADAVEROUS":PRINTZ$+"<L
> LONG":PRINTZ$+"<O> OVAL":PRINT
Z$+"<R> ROUND":PRINTZ$+"<S> SQUA
RE"
210 IFINKEY$=""THEN210 ELSESCREE
N1,1:GOTO100
220 CIRCLE(121,73),49,,.8,.42,.1
:CIRCLE(96,106),21,,1,.32,.61:CI
RCLE(146,106),21,,1,.89,.2:CIRCL
E(121,123),19,,1,.13,.37:DRAW"BM
90,124M110,135BR22M153,123":GOTO
290
230 CIRCLE(120,76),47,,1,.4,.12:
DRAW"BM87,102D20F20R28E20U20":GO
TO290
240 CIRCLE(120,85),43,,1.5,.95,.
6:CIRCLE(120,67),41,,1,.5,0:GOTO
290
250 CIRCLE(120,82),51,,1,.3,.2:C
IRCLE(122,119),20,,1,.1,.41:GOTO
290
260 CIRCLE(120,60),47,,.65,.48,.
02:CIRCLE(120,120),35,,.6,0,.5:D
RAW"BM167,62M154,120BL68M74,62":
GOTO290
270 CIRCLE(120,80),48,,1.1,.45,.
05:CIRCLE(120,119),30,,.9,.1,.4:
DRAW"BM167,94M143,136BL45M74,94"
280 '*EARS
290 GOSUB80:DRAW"C8BM215,17U6R4B
D3L4D3R4;BR4U6R3D3NL3D3;BR4U6R4D
3L4RF3;BR4R3U3L3U3R3BM232,27E2RF
2D3G2LH2BL11G2LH2U3E2RF2"
300 R$="R2E2R3F2D14G4L3H4":L$="G
4L3H4U14E2R3F2R2":B$="R2E3R4F5D1
4G4L7H6U2":I$="D2G6L7H4U14E5R5F3
R2"
310 S$="R5E10D25G8L4H8":P$="G8L4
H8U25F10R5":RB$="RE3R4F3D8G3L4H3
":LB$="LH3L4G3D8F3R4E3"
320 IFQ=1THENIFE=0THEN630ELSE ON
 E GOTO440,530,580,490
330 Q=0:A$=INKEY$
340 IFA$="E"THENE=1:GOTO440
350 IFA$="S"THENE=2:GOTO530
```

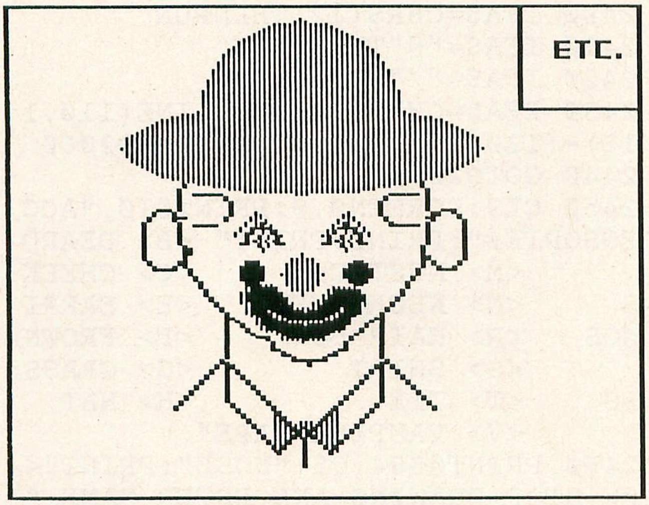
```
360 IFA$="B"THENE=3:GOTO580
370 IFA$="L"THENE=4:GOTO490
380 IFA$="N"THEN630
390 IFA$=CHR$(12)THENRUN
400 IFA$="/"THEN420
410 GOTO330
420 CLS:SCREEN0,0:PRINT@74,"EARS
":PRINT:PRINTZ$+"<B> BIG":PRINTZ
$+"<E> NORMAL":PRINTZ$+"<L> LITT
LE":PRINTZ$+"<N> NONE":PRINTZ$+"
<S> POINTY SPOCK":PRINT@448,Y$
430 IFINKEY$=""THEN430 ELSESCREE
N1,1:GOTO330
440 IFF=1ORF=6THENDRAW"BM164,83X
R$;BL83XL$;"
450 IFF=2THENDRAW"BM166,84XR$;BL
87XL$;"
460 IFF=3ORF=5THENDRAW"BM161,85X
R$;BL77XL$;"
470 IFF=4THENDRAW"BM169,82XR$;BL
93XL$;"
480 IFQ=2THEN290ELSE630
490 IFF=1ORF=2ORF=6THENDRAW"BM78
,87XLB$;BM163,87XRB$;"
500 IFF=3ORF=5THENDRAW"BM81,90XL
B$;BM159,90XRB$;"
510 IFF=4THENDRAW"BM75,90XLB$;BM
165,90XRB$;"
520 IFQ=2THEN290ELSE630
530 IFF=1ORF=5THENDRAW"BM162,86X
S$;BL73XP$;"
540 IFF=2ORF=6THENDRAW"BM165,84X
S$;BL79XP$;"
550 IFF=3THENDRAW"BM162,83XS$;BL
73XP$;"
560 IFF=4THENDRAW"BM169,80XS$;BL
87XP$;"
570 IFQ=2THEN290ELSE630
580 IFF=1ORF=6THENDRAW"BM164,83X
B$;BL80XI$;"
590 IFF=2THENDRAW"BM166,85XB$;BL
86XI$;"
600 IFF=3ORF=5THENDRAW"BM161,87X
B$;BL75XI$;"
610 IFF=4THENDRAW"BM169,82XB$;BL
90XI$;"
620 IFQ=2THEN290
630 IFF=4THEN640ELSEDRAW"BM149,1
27D20F20BL97E20U20":GOTO650
640 DRAW"BM150,121D15F20BL100E20
U15"
650 GOSUB80:DRAW"BM216,16U6D3R4U
3D6BR4U6R4D3NL4D3BR4NU6BR4U6R4D3
L4RF3;BM218,30U6E3R12F3D6L2U2H2L
10G2D2L2"
660 '*HAIR
670 A$=INKEY$
680 IFA$="A"THEN1020
690 IFA$="B"THEN940
700 IFA$="C"THEN1080
710 IFA$="D"THEN1130
720 IFA$="H"THEN1060
730 IFA$="I"THEN980
740 IFA$="L"THEN1040
750 IFA$="M"THEN1010
760 IFA$="N"THENB=1:GOTO1150
770 IFA$="O"THEN1110
780 IFA$="P"THEN920
790 IFA$="R"THEN1120
800 IFA$="S"THEN990
810 IFA$="W"THEN970
820 IFA$="/"THEN860
830 IFA$=CHR$(12)THENRUN
840 IFA$=CHR$(94)THEN890
850 GOTO670
```



```
860 CLS:SCREEN0,0:PRINT@74,"HAIR
":PRINT:PRINT"<A> AFRO        <L
> LONG        <B> BOYS        <M
> MIDDLE PART <C> CURLY       <N
> NONE        <D> DUTCH BOY   <O
> OLD FRINGE  <H> STRAIGHT    <P
> PONY TAIL"
870 PRINT"<I> INFANT      <R> RE
D FRINGE  <S> SHORT GIRLS <W> WI
DOW'S PEAK":PRINT@416,U$+"EARS":
PRINTY$
880 IFINKEY$=""THEN880ELSESCREEN
1,1:GOTO670
890 DRAW"C5M+0,0":Q=2:ON E GOTO4
40,530,580,490
900 GOTO330
910 IFINKEY$=""THEN910 ELSESCREE
N1,1:GOTO670
920 P$="E9R12F9D20F3E5D10G6L7H7U
13H4L8":O$="H9L12G9D20G3H5D10F6R
7E7U13E4R8"
930 IFF=3ORF=5THENDRAW"BM160,74X
```

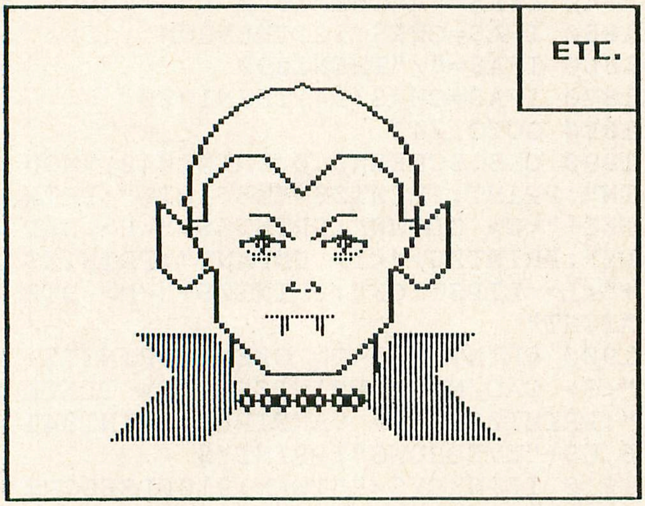
```
P$;BL85BU10XO$;"ELSEDRAW"BM165,7
0XP$;BL95BU10XO$;"
940 CIRCLE(96,6),68,,1,.15,.25:D
RAW"BM163,83L6U6H5L3H10U8BD20BL4
5L6G3D6L6"
950 IFF=2ORF=4THENDRAW"BM169,83L
9BL80L9"
960 GOTO1150
970 DRAW"BM163,83L5U13H12L11G15H
15L11G12D13L5":GOTO950
980 HR$="R8F4D4G3R8E4U5H3":DRAW"
BM75,86F3R7E2U4GL3H3U3E7R3XHR$;X
HR$;XHR$;R9F5D10G2L3H2D4F3R5E6":
GOTO950
990 CIRCLE(90,94),10,,2,.2,.65:C
IRCLE(150,94),10,,2,.85,.4:DRAW"
BM70,108E9BR80F9"
1000 CIRCLE(80,108),13,,.9,0,.55
:CIRCLE(160,108),13,,.9,.95,.5:G
OTO940
1010 CIRCLE(92,34),33,,1,.1,.35:
CIRCLE(145,32),33,,1,.15,.4:GOTO
1150
1020 B=1:FORH=98TO146STEP6:CIRCL
E(H,41),8:CIRCLE(H,36),8:NEXTH:F
ORH=108TO132STEP6:CIRCLE(H,50),8
:NEXTH
1030 CIRCLE(88,43),8:CIRCLE(152,
43),8:CIRCLE(85,48),8:CIRCLE(156
,48),8:FORV=53TO70STEP5:CIRCLE(8
0,V),8:CIRCLE(162,V),8:NEXTV:GOT
O1150:REMCIRCLE(81,58),8:CIRCLE(
161,58),8:GOTO760
1040 CIRCLE(40,139),22,,1.2,0,.3
:CIRCLE(200,139),22,,1.2,.2,.5
1050 CIRCLE(120,105),66,,1.4,.45
,.07:DRAW"BM206,162G5L30BL99L30H
5":GOTO940
1060 CIRCLE(122,112),70,,.5,.65,
.85:IFF=1THENDRAW"BM166,84L6"
1070 GOTO950
1080 B=1:FORH=91TO152STEP8:FORV=
37TO54STEP8:CIRCLE(H,V),11:NEXTV
:NEXTH:FORH=100TO140STEP8:CIRCLE
(H,30),11,,1,.5,0:NEXTH
1090 CIRCLE(88,62),11:CIRCLE(151
,62),11:CIRCLE(96,62),8:CIRCLE(1
43,62),8
1100 FORV=50TO105STEP8:CIRCLE(79
,V),11:CIRCLE(160,V),10:NEXTV:FO
RV=69TO99STEP8:CIRCLE(72,V),12:C
IRCLE(169,V),12:NEXTV:GOTO1150
1110 B=1:DRAW"BM164,85L9H4U4E4R9
BL85R9F4D4G4L9":GOTO1150
1120 B=1:FORH=73TO90STEP5:FORV=7
0TO75STEP3:CIRCLE(H,V),7:CIRCLE(
240-H,V),7:NEXTV:NEXTH:CIRCLE(80
,65),7:CIRCLE(160,65),7:GOTO1150
1130 IFF=4THENDRAW"BM74,73F5R79E
9"ELSEDRAW"BM77,73F5R73E9"
1140 '*EYES
1150 GOSUB80:DRAW"BM215,16U6R3BD
3L3D3R3BR8U3NH3E3BR4D6R3BU3L3U3R
3BR7L3D3R3D3L3;BM216,29E3R3F3BR6
E3R3F3BL4C6UBL13DC8"
1160 A$=INKEY$
1170 IFA$="B"THEN1400
1180 IFA$="C"THEN1390
1190 IFA$="E"THEN1370
1200 IFA$="I"THEN1380
1210 IFA$="L"THEN1360
1220 IFA$="M"THEN1340
1230 IFA$="O"THEN1410
1240 IFA$="S"THEN1420
1250 IFA$="T"THEN1350
1260 IFA$=CHR$(12)THENRUN
1270 IFA$="/"THEN1300
1280 IFA$=CHR$(94)THEN1330
1290 GOTO1160
1300 CLS:SCREEN0,0:PRINT@42,"EYE
S":PRINT:PRINTZ$+"<B> BIG":PRINT
Z$+"<C> CLOSED":PRINTZ$+"<E> OPE
N":PRINTZ$+"<I> LITTLE":PRINTZ$+
"<L> EYES WITH LASHES":PRINTZ$+"
<M> MAD":PRINTZ$+"<O> SLEEPY OPE
N":PRINTZ$+"<S> SURPRISED":PRINT
Z$+"<T> TIRED"
1310 PRINT@416,U$+"HAIR":PRINTY$
1320 IFINKEY$=""THEN1320 ELSESCR
EEN1,1:GOTO1160
1330 PCLS:DRAWMG$:Q=1:GOTO190
1340 DRAW"BM97,89R7C6D6U6C8F6BR2
0E6C6D6U6C8R7":GOTO1450
1350 V$="FR9EBG3NL6BE3":DRAW"C6B
M99,95XV$;BR21XV$;C8":GOTO1410
1360 DRAW"BM96,88F3E2R2H3F3R5H3B
R32G3R5E2G3R3F2E2"
1370 E$="E4R3C6D5U5C8R3F5":DRAW"
BM98,92XE$;BR15XE$;":GOTO1450
1380 E$="E3R2C6D5HU2R2D2LU4R3C8F
3G2L6H2":DRAW"BM98,93XE$;BR30XE$
;":GOTO1450
1390 CIRCLE(102,89),13,,.7,.1,.4
:CIRCLE(138,89),13,,.7,.1,.4:GOT
O1450
1400 B$="H3U5E3R3F3D5G3L3C6U2H1U
2E1R2F1D2G1L2C8D2":DRAW"BM102,97
XB$;BR34XB$;":GOTO1450
1410 CIRCLE(104,91),5:CIRCLE(136
,91),5:CIRCLE(104,91),3,6:CIRCLE
(136,91),3,6:CIRCLE(104,97),13,,
.8,.6,.9:CIRCLE(136,97),13,,.8,.
6,.9:GOTO1450
1420 CIRCLE(104,91),5,6:CIRCLE(1
36,91),5,6:CIRCLE(104,91),2,7:CI
RCLE(136,91),2,7
1430 CIRCLE(104,92),9,,1,.5,0:CI
RCLE(136,92),9,,1,.5,0
```

```
1440 '*EYEBROWS
1450 GOSUB80:DRAW"C8BM213,19U8R2
F2G2NLF2G2L2BR8U8R3FD2GL3RF3DBR4
U8R4D8L4BR8BU8D6F2E2NU3F2E2U6BM2
18,29E2R3FBR6ER3F2"
1460 Q=0:DRAW"C8":A$=INKEY$
1470 IFA$=CHR$(12)THENRUN
1480 IFA$="B"THENY=1:GOTO1700
1490 IFA$="S"THENY=2:GOTO1660
1500 IFA$="I"THENY=8:GOTO1670
1510 IFA$="M"THENY=3:GOTO1690
1520 IFA$="N"THENY=9:GOTO1730
1530 IFA$="Q"THENY=4:GOTO1710
1540 IFA$="A"THENY=5:GOTO1680
1550 IFA$="T"THENY=6:GOTO1640
1560 IFA$="C"THENY=7:GOTO1650
1570 IFA$=CHR$(94)THEN1630
1580 IFA$="/"THEN1600
1590 GOTO1460
1600 CLS:SCREEN0,0:PRINT@42,"EYE
BROWS":PRINT:PRINTZ$+"<A> ARCHED
":PRINTZ$+"<B> BUSHY":PRINTZ$+"<
C> CLOWN":PRINTZ$+"<I> INFANT":P
RINTZ$+"<M> MAD":PRINTZ$+"<N> NO
NE":PRINTZ$+"<Q> QUIZZICAL":PRIN
TZ$+"<S> SURPRISED":PRINTZ$+"<T>
 TILTED"
1610 PRINT@416,U$+"EYES":PRINTY$
```



```
1620 IFINKEY$=""THEN1620ELSESCRE
EN1,1:GOTO1460
1630 LINE(88,84)-(150,99),PRESET
,BF:GOTO1150
1640 DRAW"BM90,90E8R5BR33R5F8":G
OTO1730
1650 DRAW"C7BM94,89E9ND5F9BR17E9
ND5F9C8":GOTO1730
1660 CIRCLE(102,90),12,,1.1,.6,.
9:CIRCLE(138,90),12,,1.1,.6,.9:G
OTO1730
1670 DRAW"BM98,85R11BR20R11":GOT
O1730
1680 DRAW"BM94,90E7R8F3BR17E3R8F
7":GOTO1730
1690 DRAW"BM100,81R7F9BR9E9R7":G
OTO1730
1700 DRAW"BM94,87E4R17FL18GR17BR
12R17HL18ER17F4":GOTO1730
1710 DRAW"BM94,82E4R11F3BD5BR17E
3R13F4":GOTO1730
1720 '*MOUTH
1730 IFQ=2THEN1450ELSEGOSUB80:DR
AW"BM209,17U6F2E2D6BR4U6R4D6L4BR
8NU6R4U6BR4R4L2D6BR6U6D3R4U3D6;B
M223,28F3NR6FR4E4"
1740 A$=INKEY$
1750 IFA$="B"THEN2000
1760 IFA$="C"THEN1960
1770 IFA$="H"THEN1970
1780 IFA$="I"THEN1980
1790 IFA$="L"THEN2030
1800 IFA$="M"THEN1950
1810 IFA$="O"THEN2010
1820 IFA$="S"THEN1990
1830 IFA$="T"THEN2020
1840 IFA$="V"THEN1940
1850 IFA$=CHR$(12)THENRUN
1860 IFA$="/"THEN1890
1870 IFA$=CHR$(94)THEN1920
1880 GOTO1740
1890 CLS:SCREEN0,0:PRINT@42,"MOU
TH":PRINT:PRINTZ$+"<B> BIG":PRIN
TZ$+"<C> CLOWN":PRINTZ$+"<H> HAP
PY":PRINTZ$+"<I> INFANT":PRINTZ$
+"<L> LIPSTICK":PRINTZ$+"<M> STR
AIGHT"
1900 PRINTZ$+"<O> OPEN":PRINTZ$+
"<S> SAD/MAD":PRINTZ$+"<T> TEETH
":PRINTZ$+"<V> VAMPIRE":PRINT@41
6,U$+"EYEBROWS":PRINTY$
1910 IFINKEY$=""THEN1910ELSESCRE
EN1,1:GOTO1740
1920 Q=2:DRAW"C5":ON Y GOTO1700,
1660,1690,1710,1680,1640,1930,16
70,1450
1930 IFY=7THENDRAW"BM94,89E9ND5F
9BR17E9ND5F9":GOTO1450ELSEGOTO14
50
1940 DRAW"C7BM107,120R26L5D7H2U5
L12D5G2U7C8":GOTO2060
1950 DRAW"C7BM110,118R20BG3L12C8
":GOTO2060
1960 CIRCLE(120,114),24,7,.7,.01
,.49:CIRCLE(120,113),9,7,.7,.05,
.45:DRAW"C7BM96,115U3E4R9F5BR14E
4R9F4D3C8":PAINT(120,129),8,7
1970 CIRCLE(120,115),16,7,.5,.05
,.45:GOTO2060
1980 DRAW"C7BM112,121RE3UERF2E2R
FDF3NRG3L8H3BR6R3C8":GOTO2060
1990 CIRCLE(120,120),13,7,.3,.5,
.99:GOTO2060
```

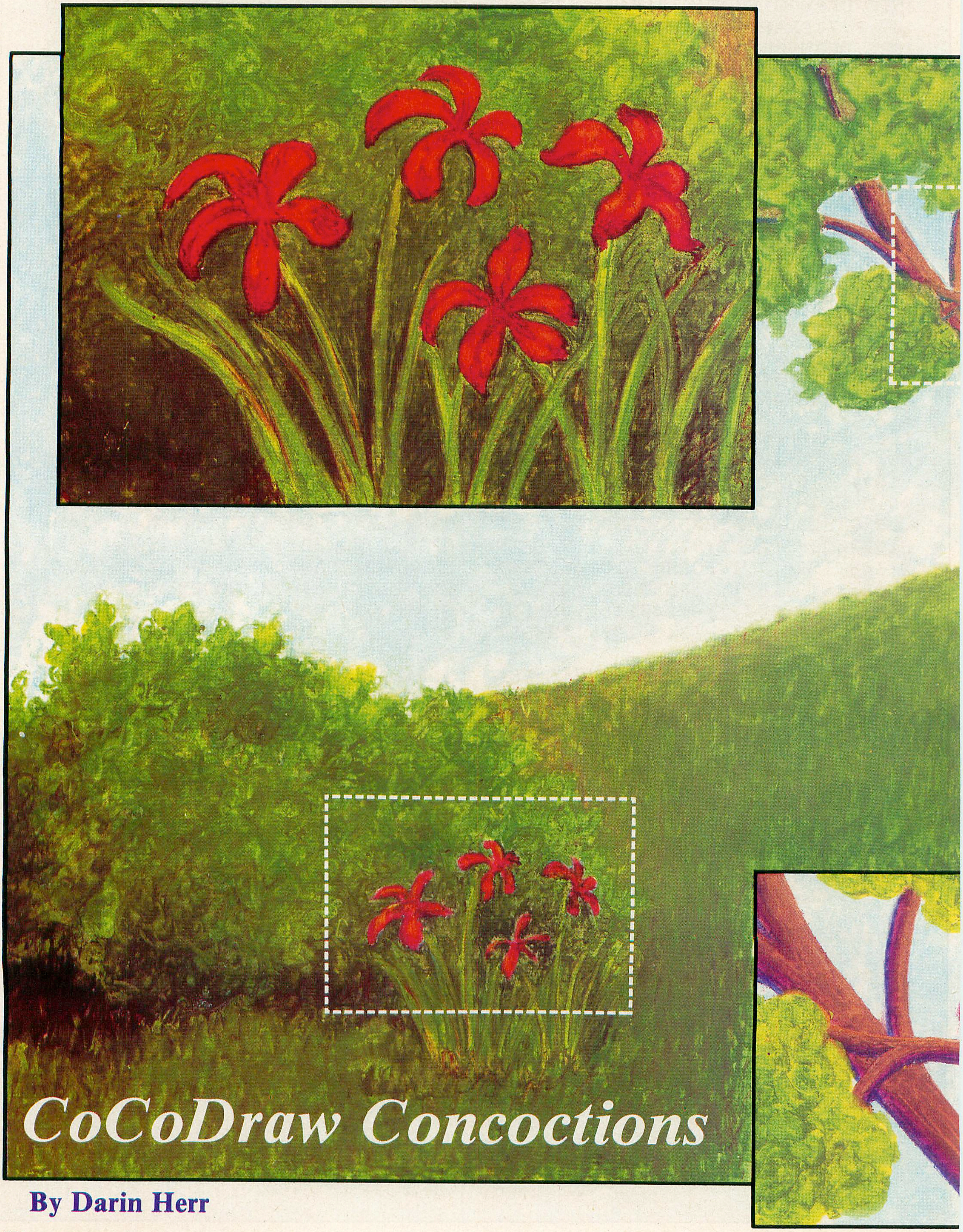
```
2000 DRAW"C7BM107,120E5R16F5G4L1
8H4R26C8":GOTO2060
2010 CIRCLE(120,119),8,7:GOTO206
0
2020 DRAW"C7BM105,118F9R12E9L30R
10C8D4R5U4D4R5U4":GOTO2060
2030 CIRCLE(121,119),11,7,.5,.08
,.47:CIRCLE(121,119),13,7,.7,.08
,.47
2040 DRAW"C7BM108,119R10F2E2R10L
2H3L4G3H3L4G3L2C8"
2050 '*NOSE
2060 GOSUB80:DRAW"BM213,15U6F6U6
BR4R4D6L4U6BR12L4D3R4D3L4BR8U6R3
BD3L3D3R3BM227,27D4G2R6H2U4"
2070 A$=INKEY$
2080 IFA$=CHR$(12)THENRUN
2090 IFA$="S"THEN2210
2100 IFA$="W"THEN2200
```



```
2110 IFA$="C"THEN2230
2120 IFA$="I"THEN PSET(117,109):
PSET(123,109):GOTO2260
2130 IFA$="N"THEN2240
2140 IFA$="P"THEN2220
2150 IFA$="/"THEN2180
2160 IFA$=CHR$(94)THENPAINT(120,
125),5,5:LINE(105,110)-(135,127)
,PRESET,BF:GOTO1730
2170 GOTO2070
2180 CLS:SCREEN0,0:PRINT@74,"NOS
E":PRINT:PRINTZ$+"<C> CLOWN":PRI
NTZ$+"<I> INFANT":PRINTZ$+"<N> N
ARROW":PRINTZ$+"<P> PUG":PRINTZ$
+"<S> STRAIGHT":PRINTZ$+"<W> WID
E":PRINT@416,U$+"MOUTH":PRINTY$
2190 IFINKEY$=""THEN2190 ELSESCR
EEN1,1:GOTO2070
2200 DRAW"BM112,110U2E2R2FNU4BE2
R5BF2NU4ER2F2D2BL5LBL7L":GOTO226
0
2210 DRAW"BM120,95D12BF3R2BL8L2"
:GOTO2260
2220 DRAW"BM124,107F3BL4LBL4LBL3
E3":GOTO2260
2230 CIRCLE(120,104),8,7:PAINT(1
20,105),7,7:GOTO2260
2240 DRAW"BM118,95D10G2D4E1R1F1R
2E1R1F1U4H2U10"
2250 '*ETC.
2260 GOSUB80:DRAW"BM218,20U6R4BD
3L4D3R4BR6U6L2R4BR4NR4D6R4BR4RUL
"
2270 A$=INKEY$
2280 IFA$="B"THEN2500
2290 IFA$="C"THEN2480
2300 IFA$="E"THEN2580
2310 IFA$="H"THEN2490
2320 IFA$="S"THEN2520
2330 IFA$="R"THEN2530
2340 IFA$="G"THEN2540
2350 IFA$="M"THEN2550
2360 IFA$="N"THEN2560
2370 IFA$="F"THEN2590
2380 IFA$="T"THEN2600
2390 IFA$="V"THEN2610
2400 IFA$=CHR$(12)THENRUN
2410 IFA$="@"THEN2620
2420 IFA$="/"THEN2450
2430 IFA$=CHR$(94)THENLINE(110,1
12)-(130,95),PRESET,BF:GOTO2060
2440 GOTO2270
2450 CLS:SCREEN0,0:PRINT@10,"ACC
ESSORIES":PRINT:PRINT" <B> BEARD
      <M> MUSTACHE      <C> CHEEK
S     <N> NECKLINE      <E> EARRI
NGS   <R> HAIR BOW      <F> FROWN
      <S> SHIRT         <G> GLASS
ES    <T> TIE           <H> HAT
      <V> VAMPIRE CAPE"
2460 PRINT@384,U$+"NOSE":PRINT"<
@> STOP DRAWING AND ENTER NAME "
+Y$
2470 IFINKEY$=""THEN2470 ELSE SC
REEN1,1:GOTO2270
2480 DRAW"BM96,105U3E3R3F3D3G3L3
H3BR41U3E3R3F3D3G3L3H3":PAINT(99
,105),8,8:PAINT(145,105),8,8:GOT
O2270
2490 B=1:CIRCLE(120,55),70,7,.26
,.8,.7:CIRCLE(120,45),40,7,1,.45
,.05:PAINT(120,50),7,7:GOTO2270
2500 BD$="BM86,76D33F22R24E22U33
R9D45G30L25H30U45R9":IFB=1THEN25
10ELSEPAINT(124,54),8,8:REM
```

```
*BEARD*
2510 DRAW"C7XBD$;C8":PAINT(120,1
40),8,7:DRAWBD$:GOTO2270
2520 DRAW"BM90,138F30D10U10E30D1
5G20H10G10H20U15":GOTO2270
2530 B=1:DRAW"C6BM116,40H8L10G2D
18F2R10E8R6F8R10E2U18H2L10G8L6C8
":PAINT(116,43),6,6:GOTO2270
2540 CIRCLE(102,91),14,7,.7:CIRC
LE(138,91),14,7,.7:DRAW"C7BM79,8
0F10BR27R10BR27E10C8":GOTO2270
2550 DRAW"BM98,118E6R32F6H6L4G1L
18H1":GOTO2270:REM**MUSTACHE**
2560 IFF=4THENCIRCLE(120,120),40
,,.7,.1,.4ELSECIRCLE(120,130),40
,,.7,.1,.4
2570 GOTO2270
2580 CIRCLE(75,105),5,6:CIRCLE(1
69,105),5,6:GOTO2270
2590 DRAW"BM118,82D5BR5U5":GOTO2
270
2600 DRAW"BM108,156C6RF7E2R4F2E7
RD16LH7G2L4H2G7LU16C8":PAINT(120
,163),6,6:GOTO2270
2610 DRAW"C7BM47,167E25H15R30M97
,152G15L35BR149H25E15L30M144,152
F15R35C8":PAINT(82,157),7,7:PAIN
T(148,152),7,7:FORH=99TO145STEP7
:CIRCLE(H,152),4:NEXTH:GOTO2270
2620 LINE(200,1)-(249,50),PRESET
,BF:LINE(6,185)-(245,170),PRESET
,BF
2630 DRAW"C5BM0,185BR85C6":L=85
2640 IFL<10THENL=10:SOUND15,1:DR
AW"BM10,185"ELSEIFL>240THENSOUND
1,1:GOTO2820
2650 A$=INKEY$:IFA$=""THEN2650
2660 IFA$="@"THEN2620
2670 IFA$="^"THENDRAW"C8":GOTO22
70
2680 IFA$="A"THENDRAW"M+0,0U10E4
F4D3NL8D7BR9"ELSEIFA$="B"THENDRA
W"M+0,0U14R5F2D2G2L5R6F2D4G2L5BR
16"
2690 IFA$="C"THENDRAW"BM+3,0H3U8
E3R2F3BD8G3L2BR13"ELSEIFA$="D"TH
ENDRAW"M+0,0U14R5F3D8G3L5BR17"
2700 IFA$="E"THENDRAW"M+0,0U14R8
BD7BL2L6D7R8BR8"ELSEIFA$="Y"THEN
DRAW"BM+4,0U7H4U3BR8D3G4D7BR12"
2710 IFA$="V"THENDRAW"BM+0,-14D1
0F4E4U10BD14BR8"ELSEIFA$="I"THEN
DRAW"M+0,0R2U14L2R4BD14L2BR9":L=
L-4
```

```
2720 IFA$="M"THENDRAW"M+0,0U14F5
E5D14BR8":L=L+2ELSEIFA$="O"THEND
RAW"BM+3,0H3U8E3R2F3D8G3L2BR13"
2730 IFA$="L"THENDRAW"NU14R8BR8"
ELSEIFA$="N"THENDRAW"U14M+8,14NU
14BR6"ELSEIFA$="R"THENDRAW"M+0,0
U14R6F2D3G2NL6F2D5BR8"
2740 IFA$="Z"THENDRAW"M+0,0BU14R
8D3G8D3R8BR8"ELSEIFA$="T"THENDRA
W"BM+4,0U14L4R8BD14BR8"ELSEIFA$=
"H"THENDRAW"M+0,0U14D7R8U7D14BR8
"
2750 IFA$="F"THENDRAW"M+0,0U14R8
BD7BL2L6D7BR16"ELSEIFA$="G"THEND
RAW"BM+2,0H2U10E2R4F2BD6NL3D4G2L
4BR14"
2760 IFA$="J"THENDRAW"BM+3,0NH3R
2E3U11BD14BR8"ELSEIFA$="K"THENDR
AW"M+0,0U14BR8G8E4F4D6BR8"ELSEIF
A$="P"THENDRAW"M+0,0U14R4F3D3G3L
4D5BR16"
2770 IFA$="Q"THENDRAW"BM+3,0H3U8
E3R3F3D8G3L3R2BU4F4BR8"ELSEIFA$=
"S"THENDRAW"BM+0,-3F3R2E3U2H3L2H
2U2E2R3F3BD11BR8"
2780 IFA$="U"THENDRAW"BM+0,-14D1
1F3R3E3U11BD14BR8"ELSEIFA$="W"TH
ENL=L+2:DRAW"BM+0,-14D14E5F5NU14
BR8"ELSEIFA$="X"THENDRAW"M+8,-14
BL8M+8,14BR8"
2790 IFA$=CHR$(8)THENDRAW"BM+0,0
BL17":L=L-32ELSEIFA$=CHR$(32)THE
NDRAW"BM+0,0BR17"ELSEIFA$=CHR$(1
2)THENRUN
2800 IFA$="."THENDRAW"BM-2,0RULD
BR8"ELSEIFA$="/"THEN2860
2810 L=L+16:GOTO2640
2820 A$=INKEY$
2830 IFA$="@"THEN2620
2840 IFA$=CHR$(12)THENRUN
2850 GOTO2820
2860 CLS:SCREEN0,0:PRINT@42,"ENT
ER NAME":PRINT:PRINT" IF THE NAM
E IS 4 OR 5 LETTERS  LONG, JUST
TYPE IT IN.  IF IT ISLONGER, HIT
 LEFT ARROW ONCE FOR EACH TWO LE
TTERS MORE  THAN 5."
2870 PRINT:PRINT"<SPACE BAR> WIL
L ENTER A SPACE.":PRINT" <^> WIL
L TAKE YOU BACK TO       ACCESSOR
IES.":PRINTY$
2880 IFINKEY$=""THEN2880ELSESCRE
EN1,1:GOTO2650
```

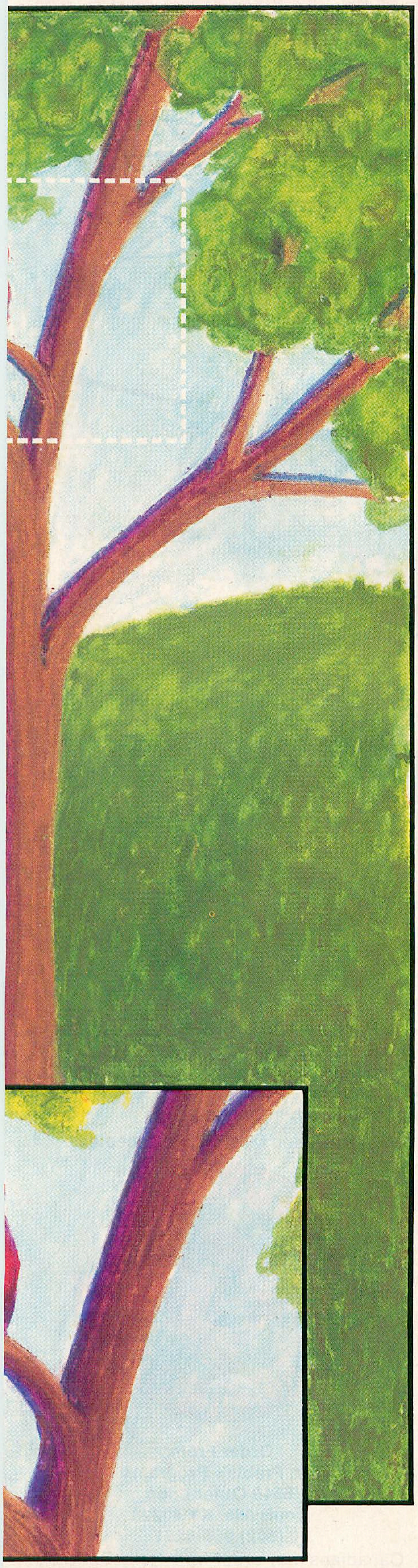


CoCoDraw Concoctions

By Darin Herr

32K Disk

32K ECB Mod.



Use this high resolution graphics editor and let your imagination run wild!

CoCoDraw is a user-friendly, high resolution (`PMODE 4`) graphics editor. It has the usual `LINE`, `CIRCLE`, `BOX`, etc., functions, plus a full character set (for adding text to pictures), an UNDO command and even a Magnify mode for detailed editing. *CoCoDraw* requires 32K, Extended BASIC and one joystick (a mouse or touchpad should also work). As listed, it requires a disk drive, but it also works with a cassette system using the modifications listed at the end of this article. A printer is optional.

Type in both listings (*CoCoDraw* and *MenuGen*) exactly as they appear and save them to disk. (Do not add any extra spaces to *CoCoDraw*, as it hardly fits in the available memory as it is!) Lines 10000 and 12000 to 12080 are the same in both programs, so you do not have to type them in twice.

Run *MenuGen* first. This program generates a file (*MENUS.SYS*) which is loaded and used every time *CoCoDraw* is run. Make sure that each disk with *CoCoDraw* on it also contains *MENUS.SYS*. Now run *CoCoDraw*, and you are ready to start.

When *CoCoDraw* is run, it initializes itself and asks if you want to use the speed up `POKE` (`POKE 65495,0`). Move the joystick left or right to select "yes" or "no" and press the button on the joystick when the one wanted is underlined.

The main menu is on the top quarter of the screen. The rest of the screen is the editing area. A little pointer should be blinking somewhere on the screen. In the upper-left section of the menu are 14 boxes, each containing an icon (a little picture symbolizing what it does). These are called tools and are what you use to create the picture.

To the right of the tools are two larger boxes labeled "Color" and "Background." These show the current foreground and background colors (or patterns). Below the tools and colors are four words: File, Size, Misc and Undo. Each of these (except Undo) triggers a pull-down menu that allows you to do things like save, load and print pictures.

The pointer can be moved around the screen using the right joystick. However, because the joystick's resolution is smaller than the screen's, the pointer can only be positioned to the nearest four dots horizontally and three dots vertically. To compensate for this, the arrow keys can be used to move the pointer as many as three dots to the right of the joystick position and two dots below it. This is limited, but with some practice you should be able to place the pointer on any dot on the screen. When part of the pointer is off the right side of the screen, it becomes distorted. When this happens, the upper-left corner of the distortion is the current point.

To select a command from the main menu, simply position the tip of the pointer over the desired option and press the joystick button.

The Tools

When a tool is selected, its icon changes colors to let you know what you are working with. Here is how to use each tool:

Draw (pencil with point down) — Leaves a line after the pointer when the button is held down.

Erase (pencil with eraser down) — When this is selected, the pointer changes to a block eight by eight dots in size. Whenever the button is pressed, the area behind the block changes to the background color. The eraser can be made smaller using the Size pull-down menu. More on that later.

Darin Herr is a sophomore at Lancaster Mennonite High School in Ephrata, Pennsylvania and a self-taught programmer. Besides computing, he enjoys tennis, biking and stamp collecting.

Help Us Battle the High Cost of Disk Drives

PROGRAMS
PREBLES
1983

NOW . . .
V-PRINT
A utility to print directory on paper
$9.95

New Lower Price Un-DISK Drives ~~$49.95~~? $34.95

You Bet! There are empty spaces in your 32K and 64K CoCo. The Preble VDOS Un-DISK helps you fill them up with PROGRAMS!

- Un-DISK uses your computer's extra memory like a fast disk drive.
- Un-DISK can store BASIC and MACHINE LANGUAGE programs.
- Un-DISK is INVISIBLE. Yup! Un-DISK does not interfere with normal Color Computer Operation.
- Un-DISK appears only when you type the magic word VDOS.
- Un-DISK comes with comprehensive instructions which you may not need because:
- Un-DISK is self-prompting and easy to use!
- Un-DISK is provided on cassette.
- Un-DISK is faster than a slow clumsy DISK DRIVE and best of all . . .
- Un-DISK is CHEAPER than a DISK DRIVE!
- Un-DISK will work even if you already own a disk but WHY BUY A DISK AT ALL?
- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

OK sure, disk drives ARE NICE. I own one. But if your finances are limited, the Un-DISK can give you much of the power of the mechanical drive. Even if you already own a disk the Un-DISK can work like a super fast extra disk.

EXTRA . . . EXTRA . . . EXTRA . . . EXTRA . . .
Additional Power For $14.95

Only with VDUMP for the Un-DISK!

- VDUMP lets you make a cassette backup copy of everything stored in the Un-DISK.
- VDUMP lets you save 5, 10, 15 or more programs on a single cassette tape file.
- VDUMP lets you switch Un-DISKs. With a single load operation replace a group of financial programs with a set of children's programs. (The new VDUMP tape overwrites the old.)
- VDUMP can allow you to save a whole lot of RAINBOW ON TAPE in a SINGLE file.
- VDUMP is the perfect companion to the Preble VDOS Un-DISK.

Available from Doctor Preble's Programs, naturally! Bringing you fine Color Computer Products Since 1983!

The Preble VDOS Un-DISK	**$34.95**
The Preble VDUMP	$14.95
Shipping & handling U.S. and Canada	$1.50
or $5.00 to other foreign points	

VISA and MasterCard accepted

DR. PREBLE'S PROGRAMS
SINCE 1983

Order From:
Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
(502) 966-8281
Canadians may order from Kelly Software

Box (the empty square) — Move the pointer to one corner of the box, then press and hold the button down while moving the opposite corner of the box. When you like it, release the button.

Circle — Position the pointer where you want the center of the circle to be, then hold the button down while adjusting the radius. To adjust the radius, put the joystick in the center vertically and move it left or right to roughly get the radius. Now, keeping the joystick at the same place horizontally, move it up or down to make fine adjustments. Release the button when you have the desired radius.

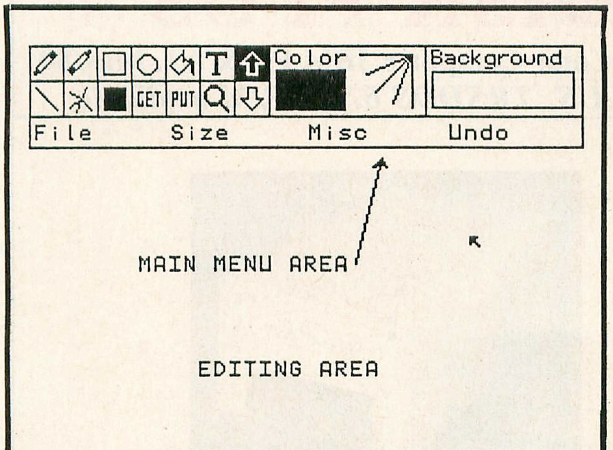


Figure 1: Main Menu

Paint (a paint can pouring paint) — Move the pointer to where you want to pour the paint and click the button. You can fill in either black or green areas.

Text (a capital 'T') — Move the pointer to where you want the first character to be and click the button. A blinking cursor appears and you may type any letter (upper- or lowercase), number or symbol on the keyboard. Press ENTER to exit this mode. The foreground color should be a solid color (not a pattern) while typing because anything else will be unreadable.

Line — Move the pointer to one end of the line, then hold the button down while moving the other end. Release the button when you like it.

Ray (several lines coming from the same point) — Move the pointer to the center point and click the button (do not hold it down). Move the end of the first ray to where you want it and click again. Do the same for as many rays as you want, but when doing the last one, hold the button down until you hear beeping (about two seconds). Now you can start another set of rays or select another option.

Solid Box (the solid square) — This works the same as Box, but when done, the box becomes solid.

Get — This is used to get an area of the screen (up to 64 by 64 dots) to be used later with PUT. Move the pointer to the upper-left corner of the area to be gotten, then press and hold the button down. Now move the bottom-right corner until you have the size you want, and release the button.

Put — This puts what you got using GET. Move the block that you got around the screen, and whenever you press the button it will be put there. You can hold the button down while moving the joystick for some interesting results. There are five PUT modes to choose from: Set, Reset, And, Or and Not. Set puts it exactly as it was gotten; Reset reverses the original colors; And puts it without erasing what is already there; Or puts it, showing what was gotten only where there is something under it. (And and Or are reversed when using green or buff on black.) Not reverses the colors in an area the same size as the area that was gotten. What was in the area that was gotten has no effect on this mode. How to change the PUT Mode will be described later.

Magnify (a magnifying glass) — When this option is selected, a 16-by-16 dot box appears, replacing the pointer. Move this box over the area you want magnified, then click the button. A new screen appears showing the area selected magnified eight times. To make changes to the original, move the pointer over the magnified dot you want to change and click the button. Its color will be inversed, as well as the corresponding dot in the Now box, to see how the change looks in actual size. If you make some changes, but then decide you liked the original better, move the pointer over the box marked Cancel, click, and the screen will be changed back to the original. When satisfied with your changes, move the pointer over the box marked Done and click. This will take you back to the main menu with the change made.

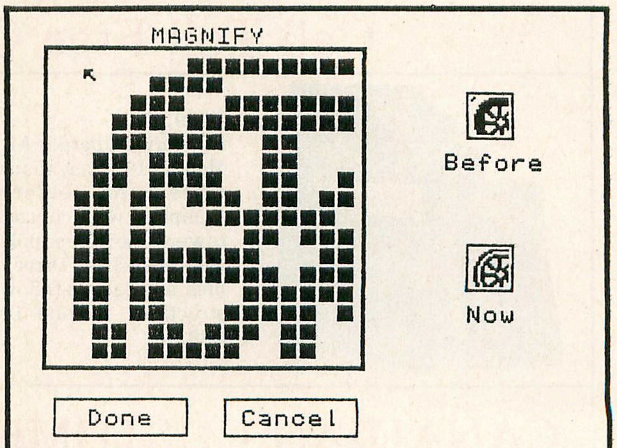


Figure 2: Magnify Option

Up Arrow — Actually, the editing area you see is just 75 percent of the entire picture. By clicking the Up Arrow you see the top 75 percent of the picture.

Down Arrow — Shows the bottom 75 percent of the picture.

Color — In the Color box is a block showing the current color, as well a little design to show how it will look when used on diagonal lines. To change color, move the pointer anywhere in the Color box and click. A new screen appears with a selection of 256 colors and patterns. To select a color, move the flashing box over the color wanted and click. If you would rather leave the color the way it was, press the space bar (even while the screen is being drawn) and you will return to the main menu.

Background — Works the same as Color, but changes the background color, which is used when erasing and when clearing the screen.

Pull-Down Menus

To use the pull-down menus, move the pointer over the word File, Size, or Misc and hold the button down. Another menu appears below it. Move the joystick up and down until the selection you want is highlighted, then let the button up.

The File menu includes the following:

Disk Load/Save — You are asked for a filename, and then asked if it is OK. If not, you return to the main menu. No error trapping is used in the disk I/O, so if you get some type of error, just type GOTO 700 and press ENTER to return to the main menu.

Disk Dir — You are asked for the drive number, and the directory of the disk in that drive is shown. Press the SHIFT and '@' keys together to pause the display, and click the joystick button to return to the main menu.

Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices

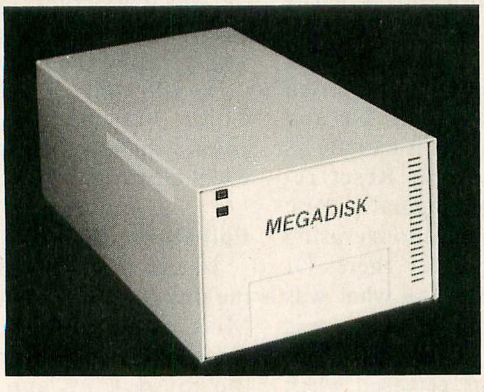
DEALER
INQUIRIES
INVITED

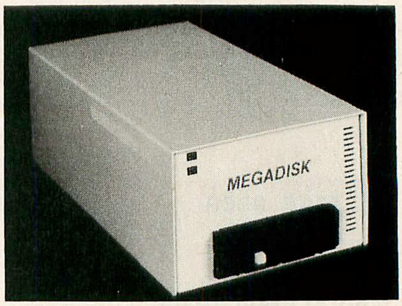
PRICE

Sizzling Summer Specials

Announcing MEGADISK PLUS +

Complete Systems! for the TRS 80 Model I/III/IV/4P, Color Computer, IBM-PC & AT, Max/80
Software Drivers: LDOS, NEWDOS/80, DOSPLUS, TRSDOS 6.x, CP/M available





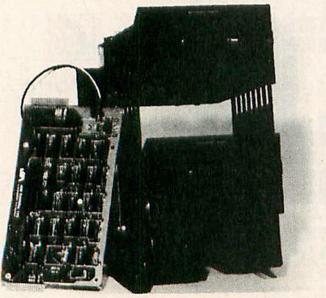
Drive a 5 to 40 Megabyte Hard Bargain Starting at $399.95

REMOVEABLE CARTRIDGE Systems Now Available!!!

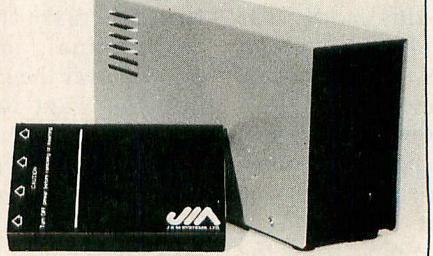
MEGAPLEX your Megadisk — 2 to 10 Port Systems

***Prices Start at a* LOW $199.95**
Models III/ IV 4P

Call Toll Free Ordering 1-800-343-8841



$259.95
Disk Drive Upgrade Kit for Model III/IV easy to install system—no soldering. Complete with controller, towers, power supply, 1 Half High Disk Drive, cables, and easy to follow instructions. Second Drive **$89.95**



High Quality Lowest Price Drive 0, 1, 2, 3 for the Color Computer Starting at $189.95.

CANADIAN CUSTOMERS PLEASE CALL 514-383-5293

Software Support Inc.

TERMS and CONDITIONS:
All prices are cash discounted. However, we do accept MC, VISA, AMEX & DISCOVER credit cards.
C.O.D.'s are accepted-No deposit required.
Purchase Orders-Corporate, Government & School P.O.'s are accepted. Please call for details.
Shipping Costs are calculated per order.
Please call for total.
Shipments of all in-stock products are made within 24 hours. Same day service is available upon request — no added cost.
Not responsible for typographical errors.
Terms and Specifications may change without notice.

MicroSmart Inc.

OUR NEW ADDRESS

200 Homer Avenue
Ashland, MA 01721
1-617-872-9090

Hours: Mon.-Fri. 10 am to 5:30 pm (est) Sat 4:00 pm

Toll Free Ordering 1-800-343-8841

Dealer Inquiries Invited

Our New Company

Service & Returns: It is our policy to repair all service returns within 24-48 hours. Normally same day turn-a-round is accomplished. It is necessary to have a (R)eturn (M)aterial (A)uthorization to insure speedy service.

IBM, TAVA, COLUMBIA, 5151, COMPAQ, EAGLE, TRS/80, HEATH/ZENITH are registered trademarks of IBM Corp., Tava Corp., Columbia Computer Corp, Key Tronics Corp, Compaq Corp, Eagle Computer, Tandy Corp, Zenith Corp, respectively.

© 1986 Software Support, Inc. *All rights reserved.*
© 1986 MicroSmart, Inc*All rights reserved.*

BREAKTHROUGH

DEALER INQUIRIES INVITED

Prices Change Every Day.
Please Call
1-800-343-8841
For Lower Prices

MEGADISK™ HARD DISK DRIVE SYSTEMS **TOLL FREE ORDERING 1-800-343-8841**

For the **IBM/PC**, Tandy 1000, **TRS/80 Models I/III/IV/4P**, Compaq, Tava, PC Workalikes, **Color Computers**, Heath/Zenith, Max/80
Complete with Hardware, Cables, Software and Quikfit Installation

5 Megabytes Internal Mount IBM/PC	Starting at $229.95
11 Megabytes Internal Mount IBM/Tandy 1000	starting at 349.95
22 Megabytes Internal Mount IBM/Tandy 1000	starting at 449.95
5 Megabytes External System	starting at 399.95
10 Megabytes External System	starting at 549.95
20 Megabytes External System	starting at 699.95
Tape Backup System — Internal or External (IBM/PC)	starting at 449.95

WOW! NEW LOW PRICES IMMEDIATE DELIVERY*

DOS Drivers: IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, 3.1 or later
TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTEED — PARTS AND LABOR — CALL TOLL FREE - 1-800-343-8841

FLOPPY DISK DRIVES, POWER SUPPLIES AND CABINETS

Our Disk Drives are UL approved — Our Floppy Drive Cabinets and Power Supplies are Underwriters Laboratory Listed and have passed the required Federal Communications Part 15 Section B-EMI/RFI tests.
Warranty on all disk drives is one full year parts and labor. Warranty on floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives and power supplies.

Full Height —

100-1	Single Sided 40 tk Bare	$99.95
	In Case with Power Supply	139.95
	Dual Drives in One Cabinet	239.95
100-2	Dual Sided 40 tk Bare	109.95
	In Case with Power Supply	149.95
	Dual Drives in One Cabinet	259.95

Half High Drives

Single Sided 40 tk Bare	79.95
In Case with Power Supply	119.95
Dual Drives in One Cabinet	209.95
Dual Sided 40 tk Bare	**109.95**
In Case with Power Supply	**149.95**
Dual Drives in One Cabinet	**259.95**

Apple/Franklin Disk Drives

35/40 Track in Case with Cable and Software	129.95

COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS

40 Track Single Head Drive with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	$189.95
Above with Dual Drives in One Cabinet	269.95
40 Track Dual Head with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	**229.95**
Above with Dual Drives in One Cabinet	**329.95**

CALL FOR MODEM SPECIALS

Modem Special 300/1200.......$199.95

***ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.**

TURBO-M™ PC

FREE—The Wiz™

CALL
TOLL FREE ORDERING
1-800-343-8841

Trademark of MicroSmart, Inc.

PRINTERS

Dot Matrix

Citizen	$ Call
Star Micronics—N.X. Series	starting at $299.95

Daisy Wheel

Silver Reed 440 80 Column 12 CPX	315.95
550 132 Column 19 CPS	439.95
770 132 Column 36 CPS	895.00
Olympia 132 Column 14 CPS WITH Form and Tractor Feed	399.95
Printer Cables	starting at 9.95
Printer Paper — Microperf Edge 1000 Sheets	16.95

ELECTRICAL

Surge protectors-Line Filter-6 Outlets with Switch	$29.95
Uninterruptable Power Supplies	399.95

MISCELLANEOUS

Diskettes in 10 Pack	from $7.95
Two print switches	from 49.95
Disk Drive Cables	from 16.00
Maintenance Cleaning Kits	12.00
Parallel Printer Buffers 8K	149.95
Floppy Disk Drive Cables	
1 Drive	16.00
2 Drives	18.95
Heath/Zenith 2 Drive Cables — Shielded	24.95

Software Support Inc.

TERMS and CONDITIONS:
All prices are cash discounted. However, we do accept MC, VISA, AMEX & DISCOVER credit cards.
C.O.D.'s are accepted-No deposit required.
Purchase Orders-Corporate, Government & School P.O.'s are accepted. Please call for details.
*Shipping Costs are calculated per order. Please call for total.
Shipments of all in-stock products are made within 24 hours. Same day service is available upon request — no added cost.
Not responsible for typographical errors.
Terms and Specifications may change without notice.

MicroSmart Inc.

OUR NEW ADDRESS

200 Homer Avenue
Ashland, MA 01721
1-617-872-9090

Hours: Mon.-Fri. 10 am to 5:30 pm (est) Sat 4:00 pm

Toll Free Ordering 1-800-343-8841

Dealer Inquiries Invited

Our New Company

Service & Returns: It is our policy to repair all service returns within 24-48 hours. Normally same day turn-a-round is accomplished. It is necessary to have a (R)eturn (M)aterial (A)uthorization to insure speedy service.
IBM, TAVA, COLUMBIA, 5151, COMPAQ, EAGLE, TRS/80, HEATH/ZENITH are registered trademarks of IBM Corp., Tava Corp., Columbia Computer Corp. Key Tronics Corp, Compaq Corp, Eagle Computer. Tandy Corp, Zenith Corp, respectively.
1986 Software Support, Inc. *All rights reserved.*
1986 MicroSmart, Inc. *All rights reserved.*
TURBO M ˙ of MicroSmart Inc.

Tape Load/Save — Same as disk. When saving, make sure the tape recorder is set to Record before saving because recording starts right away.

Screen Dump — I have included a routine that does a double-size screen dump to the Epson RX-80. Make sure the printer is online and the proper Baud rate has been set before saying the printer is ready.

The Size menu is used to change the eraser size. Just select the size you want (8 by 8, 4 by 4, or 1 by 1) and click.

The Misc menu includes:

Clear Screen — Clears the screen, but only the editing area being seen. To clear the whole picture, you must clear the top 75 percent, click the Down Arrow, and clear the bottom 75 percent.

Show Picture — This shows the whole picture at one time. Click again to get back to the main menu.

Color Set — Toggles the color set between green/black and buff/black. Use buff to get artifact colors. Green is the default.

Put Modes — Used to change the PUT mode.

Undo has no menu, it simply undoes the last operation.

TABLE 1: Line Description of *CoCoDraw*

Initialization

1-3	Clear eight graphics pages; print title screen; (the apparently unnecessary GOTOs here are to get around the PCLEAR bug in older versions of Extended BASIC)
5	Dimensions and defines variables (see variables list)
8	Reads data for the screen dump routine
10	Sets graphics mode; clears screen
20	Loads screen containing the menus
600	Gets the menus into arrays

Check for Selection From Main Menu

700	Copies picture to editing area
710	Puts Main Menu; switches to graphics screen
720	Asks if you want to use the speed-up POKE
730-780	Read joystick; check which option was selected from main menu and branch to that routine

Pull-Down Menu Routines

1000-1900	File Menu routines (1700-1710 Screen dump routine)
2000-2010	Size Menu routine
2500-2560	Misc Menu routine
3000	Undo routine

Color and Background

3500	Draws color selection screen
3510-3530	Select color/pattern using joystick

Tools

4000	Draw
4200	Erase
4400	Box and Box Fill
4600	Circle
4800	Paint
5000	Text
5200	Up Arrow
5400	Line
5600	Ray
5800	GET
6000	PUT
6200	Magnify
6400	Down Arrow

Subroutines

8000	Copies from picture to editing area
8200	Copies from editing area to picture
8500	Puts main menu and fills in colors in main menu
8800	Selects item from pull-down menus
9000	Draws pointer and waits for you to press the button
9200	Like 9400 unless you're in the main menu (see article)
9400	Reads joystick and returns
9500	Checks which arrow key was pressed
9800	Selects Yes or No using the joystick
10000	Prints a text string on the graphics screen
11000	Inputs a text string from the keyboard

Data for Character Set (in ASCII Order)

12000	'space' to '–'
12010	'.' to '9'
12020	':' to '@'
12030	'A' to 'M'
12040	'N' to 'Z'
12050	ASCII 91 to ASCII 96
12060	'a' to 'k'
12070	'l' to 'w'
12080	'x' to 'z'
13000	Data for screen dump routine

Variables

Numeric

CS = Color set

FC = Foreground color

BC = Background color

ES = Eraser size 1

PM = PUT Mode

P = Used to copy pages, POKE value, etc.

LE = Max length of input

PN = Page number

FB = Firebutton status

X,Y,XX,YY,X1,Y1=scrn. loc.

S = Menu selection

A = Misc. variable

N = Number of options in pull-down menu 1

String

S$ = String to be printed in print routine (10000)

SP$ = 'Y' if speed-up poke is allowed and 'N' if not

EX$ = Used as an extension to print routine (see article)

I$ = Inkey$

IN$ = String that was typed in input routine (11000)

FI$ = Filename

Arrays

ME = Main Menu (GP) (GP = GET/PUT array)

FI = File Menu (GP)

SI = Size Menu (GP)

MI = Misc Menu (GP)

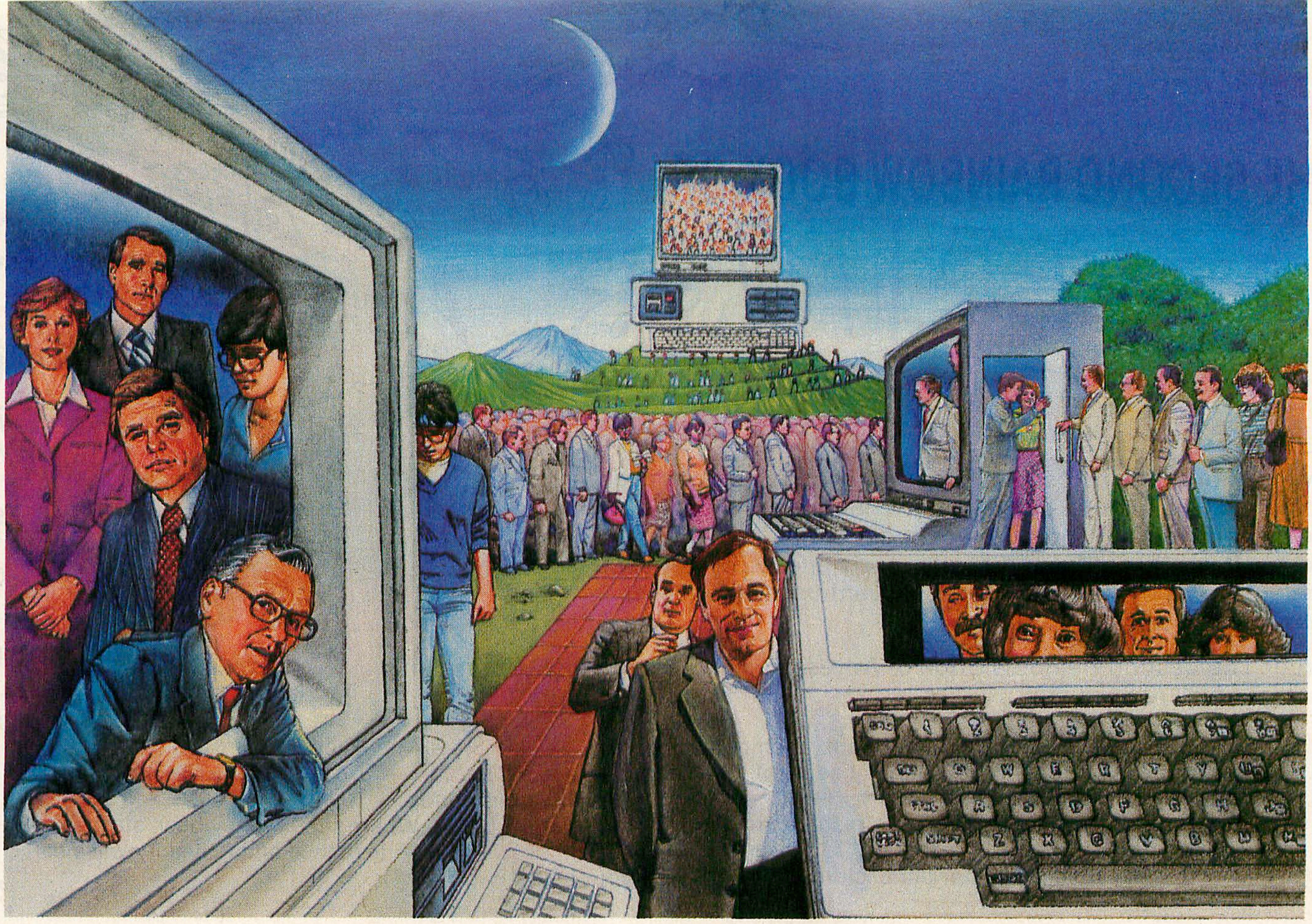
GP = GET and PUT (GP)

AR = Pointer (GP)

A = Misc. Array (GP) (Used mainly in joystick input routine)

CH$ = Draws strings for character set

D = Used in screen dump routine



USE THE BRAINS YOUR TANDY WASN'T BORN WITH.

Right at your fingertips in CompuServe's Tandy® Forums.

Our Tandy Forums involve thousands of Tandy users worldwide. These forums will show you just how easy it is to get the most from your Tandy computer.

The **Tandy Professional Forum** supports users of the larger Tandy computers, including the MS-DOS and XENIX operating systems.

The **Model 100/Portables Forum** is for users of Tandy laptop computers, providing functionality and portability in one package.

The **Color Computer Forum** is for the dual personalities of the Tandy Color Computer, the perfect home computer and highly respected microcomputer.

The **OS-9 Forum** provides support to an international group of users linked by a common operating system.

The **LDOS/TRSDOS® Forum** supports users of the LDOS operating system for Tandy Model 1 and 3 computers, as well as TRSDOS-6 users on the Tandy Model 4.

Easy access to free software, including FREE uploads.

- *Download first-rate, non-commercial user-supported software and utility programs.*
- *Upload your own programs free of connect time charges.*
- *Take advantage of CompuServe's inexpensive weeknight and weekend rates (when forums are most active, and standard online charges are just 10¢ per minute).*
- *Go online in most major metropolitan areas with a local phone call.*
- *Receive a **$25.00 Introductory Usage Credit** when you purchase your CompuServe Subscription Kit.*

Information you simply can't find anywhere else.

Use the Forum Message Board to exchange mail with fellow members. Join ongoing, real-time discussions in a Forum Conference. Scan Forum Data Libraries for free software, documentation and contributions from Tandy enthusiasts.

Enjoy other useful services too, like electronic editions of your favorite magazines, newsletters and articles, including the Tandy Corporate Newsletter and the Fort Worth Computer Chronicles.

All you need is your Tandy computer and a modem . . . or almost any other personal computer.

To buy your CompuServe Subscription Kit, see your nearest computer dealer. Suggested retail price is $39.95. To receive our free brochure, or to order direct, call 800-848-8199 (in Ohio, call 614-457-0802). If you're already a CompuServe subscriber, just type GO TANDYNET at any ! prompt and see what you've been missing.

CompuServe®

Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, Ohio 43220
800-848-8199
In Ohio, call 614-457-0802
An H&R Block Company

Mind-tingling action!

THE SECOND RAINBOW BOOK OF ADVENTURES

THE SECOND RAINBOW BOOK OF ADVENTURES

24 New Programs for the Tandy® Color Computer
From the publishers of
THE RAINBOW® The Color Computer Monthly Magazine

Twenty-four of the most challenging Adventure games ever compiled await you in this latest offering from The Rainbow Bookshelf. Journey through time, fight World War III, win the heart of a beautiful and mysterious princess. Experience the titillations of the most rugged Adventurer without ever leaving your seat.

Order The Second Rainbow Book of Adventures and among the 24 program listings you'll receive are:

Yellow Submarine — Meet the Beatles and attempt to outlast the Blue Meanies while enjoying some of the Fab Four's all-time musical hits.
Ring Quest — Regain possession of a magical ring and save a kindom.
Time Tripper — Lost in another dimension.

Chief Inspector — Who killed B.L. Brown?
Sir Randolf Returns — The sequel to a favorite from our first Adventure book.
Silverton House — Where's the money been stashed?
Ice Princess — Just one glance at this beauty will steal your heart.

Experience other traditional and contemporary challenges from these winning authors: Mark Fetherston, Jeff Crow, Larry Lansberry, J.C. Jackson, Robert W. Mangum II, Robert Poppe, David Taylor, Gregory Clark, Steve Skrzyniarz, David L. Dawson, Curtis Boyle, Bruce K. Bell, Pat Pugliano, Pat and John Everest, Mike Fahy, Scott Settembre, Darin Anderson, Robert L. Thomas, Terrance Hale, Paul Hensel, Philip Courie, Michael Dennison and Robert Dickau.

The Second Rainbow Book of Adventures sells for only $13.95!

For greater convenience, order the Second RAINBOW Book of Adventures and Adventures Tape through the shopping area of the CoCo SIG of Delphi!

THREE BONUS PROGRAMS WHEN YOU BUY THE SECOND RAINBOW ADVENTURES TAPE!

That's right. You'll receive a total of 27 fantastic Adventures when you get the Second Rainbow Adventures tape. The three bonus games are Castle Thuudo, by Carmen D. Michele; Halls of Dungeon Death, by Eric and Mark Riel; and Caves of Kalakh, by Jane Fisher — programs with listings too lengthy to include in the book. Save yourself hours of typing listings. Load these great Adventures into your computer and run them!

The Second Rainbow Adventures Tape is only $13.95.

The tape is an adjunct and complement to the book. Even if you buy the Second Rainbow Adventures Tape, you'll need the book for the introductory material and loading instructions.

Keep your Rainbow Bookshelf up-to-date!
See Page 117 for additional Rainbow Bookshelf offerings.

☐ Please send me The Second Rainbow Book Of Adventures for $13.95*

☐ Please send me The Second Rainbow Adventures Tape for $13.95

The Rainbow Bookshelf™

Name ____________________

Address ____________________

City ____________ State ________ ZIP ________

☐ My check in the amount of ________ is enclosed.*

Please charge to my: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ____________ Exp. Date ________

Signature ____________________

Mail to: The Second Rainbow Book of Adventures,
The Falsoft Building, P.O. Box 385, Prospect, KY 40059

To order by phone (*credit card orders only*) call 800-847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

*Add $1.50 shipping and handling per book. Outside the U.S., add $4. Allow 6-8 weeks for delivery. Kentucky residents add 5% sales tax for book and tape. In order to hold down costs, we do not bill. **U.S. currency *only*, please.**

f It Doesn't Work

If parts of the main menu or pull-down menus are messed up, the probem is probably in the *MenuGen* program. Try proofreading the part of *MenuGen* corresponding to the menu where the problem is.

Any other problems are most likely n *CoCoDraw*. Look up the section that doesn't work in the line-by-line description and proofread those lines.

How it works

CoCoDraw uses all eight graphics pages. Pages one to four hold the actual picture, Page five is the main menu, and pages six to eight are the editing area. When *CoCoDraw* is run, it first initializes itself by defining the variables, loading the screen containing main menu and the pull-down menus (*MENUS.SYS*) and getting them into arrays. Then it PCOPYs from the picture to the editing area, puts the main menu on the screen, and goes to a subroutine starting at Line 9000 which allows you to move the pointer around using the joystick until you click the button.

Next, in lines 740 to 780 it checks to see if you were in the menu area when you clicked, and if so, it branches to the routine selected. That routine then takes control until another option is selected from the main menu. The program is very structured, so it should not be too difficult to follow. Here is a list of the major subroutines and how they are used:

8000 — Copies pages one to three to the editing area if PN=1 or pages two to four to the editing area if PN=2. Used in Undo and in most of the tools, such as in Line to erase the line you are making as you move it around. Also used to erase a pull-down menu and several other places as well.

> ***"Actually, the editing area you see is just 75 percent of the entire picture. By clicking the Up Arrow you see the top 75 percent of the picture."***

8200 — Copies the editing area to pages one to three if PN=1 or to pages two to four if PN=2. Opposite of 8000.

8500 — Puts the main menu on the screen and fills in the Color and Background boxes.

8800 — This is the routine that allows you to select an option from a pull-down menu. Returns when you click the button. You must give it 'N' (the number of items in the menu minus one) and 'XX' (the 'X' value of where you want the menu to be). It gives you 'S' (the number of the item selected, with one being at the top).

9000 — Allows you to move the pointer around the screen using the joystick. Returns when you click the button. Gives you 'X' and 'Y', the screen location of the pointer when the button was clicked. It gets 'X' using JOYSTK(0)*4+XO. (XO is used to allow more detailed movement using the arrow keys on the keyboard.) Y=JOYSTK(1)*3YO.

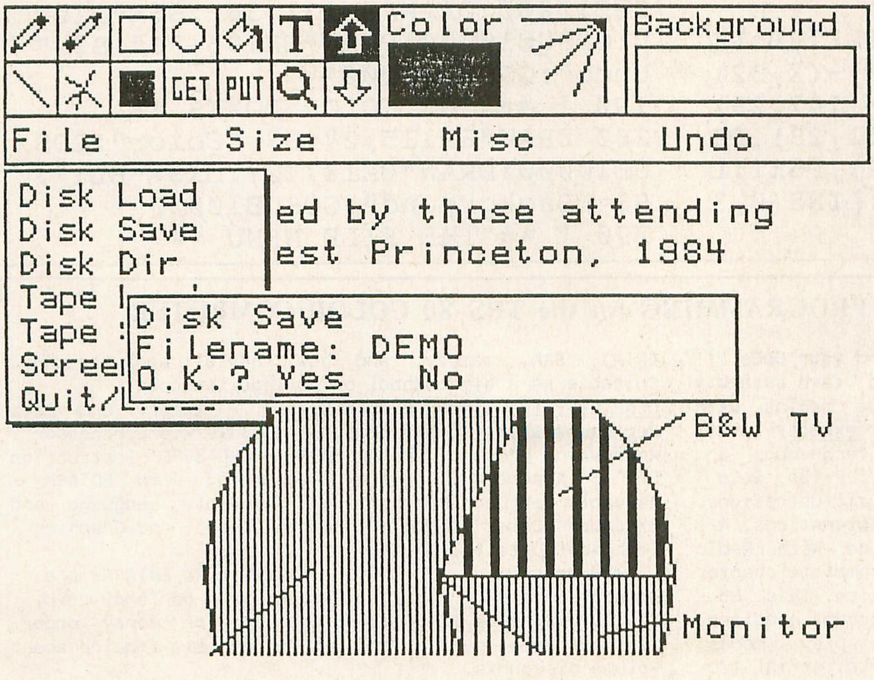
9200 — Checks the location of the joystick and the status of the button and returns immediately *only* if the position is in the editing area. If the position is in the main menu, it draws the pointer until you press the button or move into the editing area. If you press the button, it goes to Line 740 which checks what was selected and branches to it. If you move into the editing area, it returns.

9400 — Checks the location of the joystick and the status of the button. Returns immediately. Gives you 'X' and 'Y' (the screen location of the joystick), and 'FB', which equals 254 (&HFE) if the button is pressed.

9500 — Used by 9400. Checks which arrow key is pressed and changes XO (X-offset) and YO (Y-offset) accordingly. Returns immediately.

9800 — Prints Yes and No on the screen starting at location 'X,Y' and lets you use the joystick to select one. Returns when button is pressed. If A<32 then the answer is yes.

10000 — Draws S$ starting at the current DRAW location, where S$ equals any string of text you want printed on the graphics screen. It can also use the variable EX$. EX$ equals any DRAW string you want inserted between each



Disk Save
Filename: DEMO
O.K.? Yes No

Figure 3: File Menu

character. It is used in this program as BL1 to put less space between each character. Under normal use, EX$ equals the null string (" ").

11000 — This is the input routine used in entering the filename for saving and loading and for adding text to your picture. You give it 'X' and 'Y', the screen location to start at; LE, the maximum length of the string to be input; and KE$, which limits which keys will be accepted. If you want all keys to be accepted, make KE$ equal to "ALL." If you want just 'Y' and 'N' allowed, make KE$ equal to "YyNn." It gives you IN$, the string that was input. Returns when ENTER is pressed.

See Table 1 for a line-by-line description and a variable list.

Modifications

To make this program work on a non-disk system:

A. Change Line 1000 to:

```
1000 GOSUB8200:PUT(0,48)-(79,1
23),FI:XX=0:N=6:GOSUB8800:PO
KE65494,0:IFS=7THEN1900ELSEIF
S<4THEN700
```

B. Change Line 1100 to:

```
1100 CSAVEMFI$,1536,7679,44539
```

C. Delete Line 20

D. Take lines 40 to 520 from *MenuGen* and insert them into *CoCoDraw*. (You can do this because you have about 2K more memory than disk systems.)

E. To use, just CLOAD and run.

If you do not have a printer, add `GOTO 700:REM` to Line 1690. If you want to use another screen dump routine, delet lines 8, 1700, 1710 and 13000, and pu your routine in lines 1700 to 189 Remember to add a `GOTO 700` at the en of the routine so the program will retur to the main menu when the printing i done. Check back issues of THE RAINBOW for screen dump programs fo other printers.

Special thanks to Daryl Hoover, wh let me use his printer (an Epson RX-80 to write the screen dump routine included with this program.

If you have any questions or comments about *CoCoDraw*, I would lik to here from you at Rt. #2, Box 223 Ephrata, PA 17522. Please include a SASE if you want a return reply. □

130 236
400 130
10000 189
12030 226
END 87

Listing 1: MENUGEN

```
0 ' MENUGEN, BY DARIN HERR
1 ' FOR USE WITH COCODRAW V1.1
2 GOTO 8
5 PCLEAR8:DIMCH$(90):FORA=0TO90:
READCH$(A):NEXT:GOTO10
8 PCLEAR8:GOTO5
10 PMODE4,5:COLOR0,1:PCLS:SCREEN
1,0
40 ' ** THE POINTER **
50 DRAW"BM0,124R3G3U3F4"
90 ' ** THE MAIN MENU **
100 LINE(0,0)-(255,46),PSET,B:FO
RX=0TO112STEP16:LINE(X,0)-(X,32)
,PSET:NEXT:LINE(115,11)-(147,29)
,PSET,B:LINE(187,12)-(251,28),PS
ET,B:LINE(184,0)-(184,32),PSET:L
INE(0,16)-(112,16),PSET:LINE(0,3
2)-(255,32),PSET
110 DRAW"BM11,2G8D3LUR2UDRE8HL2D
R2DL2;BM20,13E8U3RDL2DULG8FR2UL2
UR2;BM35,3R10D10L10U10;BM54,4R3F
3D3G3L3H3U3E3;BM71,4G5F4E5RD4FU6
LULDLH2D2U5;BM83,5U2R9D2HL3D8FL3
EU8L4;BM104,3G5R3D5R4U5R3H5"
120 DRAW"BM3,19F10;BM24,24;M27,1
9;BM24,24;F5H5;M22,30;BM24,24;M1
9,28;BM24,24;M19,21;BM53,21L2D6R
2U2BU4BR4L2D3R2L2D3R2BR3U6LR2;BM
67,24R2U3L2D6BR4BU6D6R2U6BR2R2LD
6;BM85,18R3F3D3GDF3DH4GL3H3U3E2R
4F2D3G2L3H2U3E1;BM102,19D5L3F5E5
L3U5L3"
130 LINE(35,19)-(45,29),PSET,BF
140 DRAW"BM3,36":S$="File":GOSUB
10000:DRAW"BM67,36":S$="Size":GO
SUB10000:DRAW"BM131,36":S$="Misc
":GOSUB10000:DRAW"BM195,36":S$="
Undo":GOSUB10000
190 ' ** THE COLOR BOXES **
200 DRAW"BM115,2":S$="Color":GOS
UB10000:DRAW"BM187,2":EX$="BL1":
S$="Background":GOSUB10000
290 ' ** THE FILE MENU **
```

ASSEMBLY LANGUAGE PROGRAMMING for the TRS-80 COLOR COMPUTER

At last - The book exclusively for you and your CoCo !! You've learned BASIC and are now ready to learn assembly language programming. This hands-on guide begins with the basics and progresses to the expert level; revealing programming conventions and techniques and all the internal capabilities of the TDP-100, CoCo 1 and 2. At every step of the way are illustrations, sample programs, and plain English explanations. All sample programs are shown as assembled with Radio Shack's EDTASM+ cartridge. Plus, a complete chapter explains how to use all EDTASM+ capabilities. This book describes how to write subroutines, interrupt handlers, programs that control the graphics display modes, cassette, disk, keyboard, sound, joysticks, serial I/O, interrupts, and use of ROM resident subroutines. Also covered are the MC6809E microprocessor, the video display generator (VDG), peripheral interface adapters (PIA), SAM, memory, and how they all work together. Suitable as a high school or college textbook.

CHAPTERS: The Binary Number System - Memory and Data Representation - Introduction MC6809E Microprocessor - Addressing Modes of the MC6809E - MC6809E Instruction Set - Assembly Language Programming with EDTASM+ - Assembly Language Programming - Assembly Language and Extended Color BASIC - Internal Control and Graphics - Technical Details.

289 pages
soft cover

TRS-80 & EDTASM+ are trademarks of Tandy Corp

$16.00 U.S. plus $1.50 shipping. Check or money order. RI residents please add 6% sales tax. Inquire about volume discounts.

Published and sold by

TEPCO
30 Water Street
Portsmouth, RI 02871

```
300 LINE(0,48)-(78,122),PSET,B:L
INE(2,123)-(79,123),PSET:LINE-(7
9,50),PSET
310 EX$="BL1":DRAW"BM5,52":S$="D
isk Load":GOSUB10000:DRAW"BM5,62
":S$="Disk Save":GOSUB10000:DRAW
"BM5,72":S$="Disk Dir":GOSUB1000
0:DRAW"BM5,82":S$="Tape Load":GO
SUB10000:DRAW"BM5,92":S$="Tape S
ave":GOSUB10000
320 DRAW"BM5,102":S$="Screen Dum
p":GOSUB10000:DRAW"BM5,112":EX$=
"BL1":S$="Quit/BASIC":GOSUB10000
390 ' ** THE SIZE MENU **
400 LINE(80,48)-(158,92),PSET,B:
LINE(82,93)-(159,93),PSET:LINE-(
159,50),PSET
410 DRAW"BM85,52":S$="Eraser Siz
e":GOSUB10000:DRAW"BM85,62":S$="
  1 x 1":GOSUB10000:DRAW"BM85,72
":S$="  4 x 4":GOSUB10000:DRAW"B
M85,82":S$="> 8 x 8":GOSUB10000
490 ' ** THE MISC MENU **
500 LINE(160,48)-(238,142),PSET,
B:LINE(162,143)-(239,143),PSET:L
INE-(239,50),PSET
510 DRAW"BM165,52":S$="Clear Scr
een":GOSUB10000:DRAW"BM165,62":S
$="Show Picture":GOSUB10000:DRAW
"BM165,72":S$="Color Set":GOSUB1
0000:DRAW"BM165,82":S$="PUT Mode
":GOSUB10000:DRAW"BM165,92":S$="
> Set":GOSUB10000:DRAW"BM165,102
":S$="  Reset":GOSUB10000
520 DRAW"BM165,112":S$="  And":G
OSUB10000:DRAW"BM165,122":S$="
Or":GOSUB10000:DRAW"BM165,132":S
$="  Not":GOSUB10000:EX$=""
600 EXEC44539:INPUT"PRESS [ENTER
] WHEN READY TO SAVE";A$:SAVEM"M
ENUS.SYS",9728,14333,44539
610 END
9990 ' ** HI-RES PRINT ROUTINE *
*
10000 FORA=1TOLEN(S$):DRAWCH$(AS
C(MID$(S$,A,1))-32)+EX$:NEXT:RET
URN
11990 ' ** CHARACTER DATA **
12000 DATA BR7,BR2D4BD2D0BU6BR5,
BRDBR2UBR4,BD2R4HD4EL4FU4BUBR6,B
R4BDL4D2R4D2L4R2DU6BR5,DRUBR3DG4
DBR3URDBU6BR3,BRRFG3DFRE2BD2H4UB
UBR7,BRDRUBR5,BR3G2D2F2BU6BR4,BR
F2D2G2BU6BR6,BD3R4BD2H4BD4E4BUBR
3,BD3R4BG2U4BUBR5,BD6BR2GBU7BR6,
BD3R4BU3BR3
12010 DATA BD6BR2R0BU6BR5,BD6UE4
UBR3,BDD4FR2EU4HL2BD3BRR0BE3BR2,
BR2D6RL2BU5EBR5,BDER2FDG4R4BU6BR
3,BDER2FDGL2R2FDGL2HBE5BR2,D3R4L
D3U6BR4,R4L4D3R4D3L4BE6BR,BDD4FR
2EUHL2BU3R2FBEBR2,DUR4D2G3DBE6,B
DDFR2FDGL2HUER2EUHL2BR6,BRR2FD4G
L2HBU4DFR3BE3
12020 DATA BD3BR2D0BD3U0BU6BR5,B
D3BR2D0BD3GBU7BR6,BR3G3F3BU6BR4,
BD2R4BD2L4BE4BR3,BRF3G3BE6,BD2UE
R2FD2L2DBD2U0BU6BR5,R4D4L2U2R2BD
4L4U6BR7
12030 DATA BDD5U2R4D2U5HL2BR6,D6
R3EUHL2R2EUHL2BR6,BDD4FR2EBU4HL2
BR6,D6R2E2U2H2LBR6,D3R3L3D3R4BU6
L4BR7,D6U3R3L3U3R4BR3,BDD4FR2EU2
L2R2BU2HL2BR6,D6U3R4D3U6BR3,R4L2
D6L2R4BU6BR3,BD4DFR2EU5BR3,D6U3R
F3H3E3BR3,D6R4BU6BR3,D6U5RFDUERD
5U6BR3
12040 DATA D6U5RFD2F2U6BR3,BDD4F
R2EU4HL2BR6,D6U3R3EUHL2BR6,BDD4F
REHF2HEU3HL2BR6,D6U4F4H3R2EUHL2B
R6,BDDFR2FDGL2HBE4HL2BR6,R2D6U6R
2BR3,D6R4U6BR3,D3FDFEUEU3BR3,D5F
EUDFEU5BR3,DF4DBL4UE4UBR3,DFDFD2
U2EUEUBR3,R4DG4DR4BU6BR3
12050 DATA BRR2L2D6R2BU6BR4,BD8L
R6BU8BR2,BRR2D6L2BE6,BD2E2D6U6F2
```

Two-Liner Contest Winner . . .

Hit the white balloons with your arrows, but don't waste arrows because each shot creates a dangerous black balloon which you must avoid. Use the right joystick and firebutton.

The listing:

```
0 IFA=0THENCLS:PRINT"SCORE :"S:F
ORI=1TO50:PRINT@RND(30)+RND(9)*3
2,"O";:NEXT:A=1:GOTOELSEPRINT@44
8,TAB(JOYSTK(0)*.47)"<^>
                  ";:IF(PEEK(652
80)AND1)=0 THENPRINT@RND(224)+31
,"o";:GOTO1ELSE0
1 FORI=417+INT(PEEK(346)*.47)TO3
2STEP-32:IFPEEK(1024+I)=79THENPR
INT@I,"X";:PRINT@I+32," ";:PLAY"
T99AB":S=S+10:PRINT@8,S:IFINT(S/
300)=S/300THENA=0:GOTOELSE0ELSEI
FPEEK(1024+I)=15THENPLAY"T2BAG"E
LSEPRINT@I,"^";:PRINT@I+32," ";:
NEXT:PRINT@I+32," ";:GOTO
```

Vick Mishra
Newington, CT

(For this winning two-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

```
BU2BR3,BL7,BR7
12060 DATA BD2R3FD3L3HER3BU4BR3,
D6R3EU2HL2BU2BR6,BD3D2FR2EBU2HL2
BU2BR6,BD3D2FR3U4L3R3U2BR3,BD3DR
4UHL2GD2FR3BU6BR3,BD3R3L2D3U5ERF
BEBR2,BD3D2FR3DGL3BR4BUU5L3R3BU2
BR3,D6U4R3FD3BU6BR3,BDBR2D0BD2D3
BU6BR5,BD7FR2EU4BU2U0BUBR3,D6U3F
3H2E2BU2BR4
12070 DATA BR2D6RBU6BR4,BD2D4U4R
2D4U4RFD3BU6BR3,BD2D4U4R3FD3BU6B
R3,BD3D2FR2EU2HL2BU2BR6,BD2D6U2R
3EU2HL2BU2BR6,BD3D2FR3D2U6L3BU2B
R6,BD2D4U2E2R2BU2BR3,BD3FR2FGL3B
E4L3BU2BR6,BD2R2LU2D5FEBU5BR4,BD
2D3FR2EU3BU2BR3,BD2DFDFEUEUBU2BR
3,BD2D3FEUDFEU3BU2BR3
12080 DATA BD2F4H2G2E4BU2BR3,BD2
DFDFG2E3UEUBU2BR3,BD2R4G4R4BU6BR
3
```

730	33	5200	97	9520	8
1030	159	6000	150	11020	128
1900	79	6240	137	12010	86
3000	224	6290	246	12050	170
4230	116	8830	119	END	181

Listing 2: COCODRAW

```
0 'COCODRAW V1.1 BY DARIN HERR
1 GOTO3
2 CLS:PRINT@108,"COCODRAW":PRINT
@142,"V1.1":PRINT@207,"BY":PRINT
@235,"DARIN HERR":PRINT@270,"198
6":PRINT@449,"INITIALIZING-ONE M
OMENT PLEASE":GOTO5
3 PCLEAR8:GOTO2
5 DIM A(102),AR(1),ME(307),FI(15
1),SI(92),MI(191),GP(102),CH$(90
):FORA=0TO90:READCH$(A):NEXT:BC=
3:ES=7:PN=1:PM=1:LE=40
8 DIMD(15):FORA=0TO15:READD(A):N
EXT
10 PMODE4,5:COLOR0,1:PCLS
20 LOADM"MENUS.SYS"
600 GET(0,124)-(4,128),AR,G:GET(
0,0)-(255,47),ME:GET(0,48)-(79,1
23),FI:GET(80,48)-(159,93),SI:GE
T(160,48)-(239,143),MI
700 GOSUB8000
710 GOSUB8500:SCREEN1,CS
720 IFSP$=""THENLINE(56,84)-(197
,117),PRESET,BF:LINE(57,85)-(196
,116),PSET,B:DRAW"BM64,88":S$="D
o you want to use":GOSUB10000:DR
AW"BM64,97":S$="the Speed-Up POK
E?":GOSUB10000:X=101:Y=106:GOSUB
9800:IFA<32THENSP$="Y":GOTO1110E
LSESP$="N":GOSUB8000
730 GOSUB 9000
740 PLAY"O3T16C":IFY>47THEN730
750 IFY>32THENS=INT(X/64)+1:ONS
GOTO1000,2000,2500,3000
760 IFX>111THENS=X:GOTO3500
770 X=INT(X/16)*16:Y=INT(Y/16)*1
6:S=(X/16+1)+7*Y/16:IFS=7ORS=14T
HEN780ELSEPUT(X+1,Y+1)-(X+15,Y+1
5),A,NOT
780 ONS GOTO4000,4200,4400,4600,
4800,5000,5200,5400,5600,4400,58
00,6000,6200,6400
1000 GOSUB8200:PUT(0,48)-(79,123
),FI:XX=0:N=6:GOSUB8800:POKE6549
4,0:IFS=7THEN1900ELSEIFS=3THENGO
SUB8000:CLS:INPUT"DRIVE #";P:IFP
>3THEN700ELSEDIRP:FORA=1TO2STEP0
:IF(PEEK(&HFF00)OR&H80)<>&HFE TH
ENNEXTELSE700
1010 POKE178,0:POKE179,3:LINE(36
,84)-(217,117),PRESET,BF:LINE(37
,85)-(216,116),PSET,B:IFS=6THEN1
690ELSEIFS<3THENS$="Disk"ELSES$=
"Tape"
1020 IFS=1ORS=4THENS$=S$+" Load"
ELSES$=S$+" Save"
1030 DRAW"BM40,88":GOSUB10000:DR
AW"BM40,97":S$="Filename:":GOSUB
10000:IFS<3THENLE=14ELSELE=8
1040 X=110:Y=97:KE$="ALL":GOSUB1
1000:FI$=IN$
1050 DRAW"BM40,106":S$="O.K.?":G
OSUB10000:X=82:Y=106:GOSUB9800:I
FA>31THEN1110
1060 IFS>3THEN1090
1070 IFS=1THENLOADMFI$ELSESAVEMF
I$,3584,9727,44539
1080 GOTO1110
1090 IF S=4 THEN PMODE4,1:SCREEN
1,CS:CLOADMFI$:PMODE4,5:SCREEN1,
CS:GOTO1110
1100 CSAVEMFI$,3584,9727,44539
1110 GOSUB8000:IFSP$="Y"THENPOKE
65495,0
1120 GOTO730
1690 S$="Screen Dump":DRAW"BM87,
88":GOSUB10000:S$="Is printer re
ady?":DRAW"BM67,97":GOSUB10000:X
=99:Y=106:GOSUB9800:IFA>31THEN11
10
1700 PRINT#-2,CHR$(27)"@"CHR$(27
)"A"CHR$(8):S$=CHR$(27)+"K"+CHR$
(128)+CHR$(1):FORA=1536TO1567:FO
RX=1TO2:PRINT#-2,S$;:FORB=191TO0
STEP-1:P=NOT(PEEK(A+32*B)):IFX=1
THENC=(P AND240)/16ELSEC=P AND15
```

XTEAM & OS-9 BOTH WINNERS

XTERM

OS-9 Communications program.

- Menu oriented
- Upload/download. Ascii or XMODEM protocol
- Execute OS-9 commands from within XTERM
- Definable macro keys
- Works with standard serial port, RS232 PAK, or PBJ 2SP Pack, Includes all drivers.
- Works with standard screen. XSCREEN, or WORDPAK 80 column board.

$49.95 with source **$89.95**

XMENU

Creates a menu driven environment for OS-9.

- Create your own menus
- Works with standard screen, XSCREEN, WORDPAK, O-PAK

$29.95 with source **$59.95**

XSCREEN

OS-9 hi-res screen

- 51/64/85 chars per line
- Easy menu operation

$19.95 with source **$39.95**

XDIR & XCAL

Hierarchial directory
- Full sorting
- Complete pattern matching

OS-9 calculator
- Decimal, Hex, Binary
- +, -, *, /, AND,OR, XOR, NOT

$24.95 with source **$49.95**

XDIS

OS-9 disassembler

$34.95 with source **$54.95**

XWORD

OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or O-PAK
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Execute OS-9 commands from within
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Page numbering in decimal or Roman numerals
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE

Mail merge capabilities for XWORD

$24.95 with source **$49.95**

XSPELL

OS-9 spelling checker, with 20000 and 40000 word dictionaries

$39.95

XTRIO

XWORD/XMERGE/XSPELL

$114.95 with XWORD/XMERGE sourc**$199.95**

XED

OS-9 full screen editor

$39.95 with source **$79.95**

AND FOR RS DOS ...

SMALL BUSINESS ACCOUNTING

This sales-based accounting package is designed for the non-accounting oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vendor status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List. **$79.95**

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter / update salesman records, and update the SBAP inventory. **$59.95**

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Additional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware. **$59.95**

These programs are user friendly and menu driven. Sample transactions are included. Each package features a hi-res screen. Each requires a printer, a minimum of 32k and at least 1 disk drive.

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, prepares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accounting package. **$59.95**

ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package. **$59.95**

MICROTECH CONSULTANTS INC.

1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

VISA
MasterCard

Ordering Information

Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $2.50), personal checks.

(612) 633-6161

```
1710 PRINT#-2,CHR$(D(C));CHR$(D(
C));:NEXTB:PRINT#-2,CHR$(0):NEXT
X,A:GOTO700
1900 GOSUB8000:CLS:PRINT"TYPE 'C
ONT [ENTER]' TO RESTART  PROGRAM
.":PRINT:STOP:GOTO700
2000 GOSUB8200:PUT(64,48)-(143,9
3),SI:XX=64:N=3:GOSUB8800:IFS=1T
HENGOSUB8000:GOTO730
2010 POKE178,0:POKE179,3:LINE(69
,62)-(74,89),PRESET,BF:DRAW"BM69
,"+STR$(S*10+42)+CH$(30):GET(64,
48)-(143,93),SI:S=S-2:ES=S*4-SGN
(S):GOTO700
2500 GOSUB8200:PUT(128,48)-(207,
143),MI:XX=128:N=8:GOSUB8800:IFS
<5THENONS GOTO2510,2520,2540,255
0ELSE2560
2510 GOSUB8000:LINE(0,48)-(255,1
91),PRESET,BF:GOTO730
2520 GOSUB8000:PMODE4,1:SCREEN1,
CS
2530 GOSUB9400:IFFB<>&HFE THEN25
30ELSEPMODE4,5:GOTO700
2540 CS=ABS(CS-1):SCREEN1,CS:GOS
UB8000:GOTO730
2550 GOSUB8000:GOTO730
2560 POKE178,0:POKE179,3:LINE(13
3,92)-(138,139),PRESET,BF:DRAW"B
M133,"+STR$(S*10+42)+CH$(30):PM=
S-4:GET(128,48)-(207,143),MI:GOS
UB8000:GOTO700
3000 GOSUB8000:GOTO730
3500 GOSUB8200:PCLS:FORY=3TO191S
TEP12:FORX=3TO256STEP16:A=(Y-3)/
12*16+(X-3)/16:POKE178,A:LINE(X,
Y)-(X+7,Y+6),PSET,BF:IFINKEY$<>"
"THEN700ELSENEXTX,Y:IFBC=0THENPO
KE178,3ELSEPOKE178,0
3510 X=INT(JOYSTK(0)/4)*16+2:Y=I
NT(JOYSTK(1)/4)*12+2:LINE(X,Y)-(
X+9,Y+8),PSET,B:LINE(X,Y)-(X+9,Y
+8),PRESET,B:FB=PEEK(&HFF00)OR&H
80:I$=INKEY$:IFFB<>&HFE ANDI$=""
THEN3510
3520 A=(Y-2)/12*16+(X-2)/16:IFI$
<>""THEN700ELSEIFS<184THENFC=A E
LSEBC=A
3530 GOTO700
4000 GOSUB9000:IFY<48THENGOSUB85
00:GOTO740ELSEGOSUB8200:LINE(X,Y
)-(X,Y),PRESET
4010 GOSUB9400:LINE-(X,Y),PSET:I
FFB=&HFE THEN4010ELSE4000
4200 GOSUB 8200:IFBC=0THENPOKE17
8,3ELSEPOKE178,0
4210 GOSUB9200:IFX>255-ES THENX=
255-ES
4220 IFY>191-ES THENY=191-ES
4230 GET(X,Y)-(X+ES,Y+ES),A,G:LI
NE(X,Y)-(X+ES,Y+ES),PSET,BF:LINE
(X,Y)-(X+ES,Y+ES),PRESET,BF:IFFB
<>&HFE THENPUT(X,Y)-(X+ES,Y+ES),
A,PSET
4240 GOTO4210
4400 GOSUB9000:XX=X:YY=Y:IFY<48T
HENGOSUB8500:GOTO740ELSEGOSUB820
0
4410 GOSUB9400:LINE(XX,YY)-(X,Y)
,PRESET,B:LINE-(XX,YY),PSET,B:IF
FB=&HFE THENGOSUB8000:GOTO4410EL
SEIFS>7THENLINE(XX,YY)-(X,Y),PSE
T,BF
4420 GOTO4400
4600 GOSUB9000:XX=X:YY=Y:IFY<48T
HENGOSUB8500:GOTO740ELSEGOSUB820
0
4610 GOSUB9400:CIRCLE(XX,YY),ABS
(X+Y/12-8):IFFB=&HFE THENGOSUB80
00:GOTO4610ELSE4600
4800 GOSUB9000:IFY<48THENGOSUB85
00:GOTO740ELSEIFPPOINT(X,Y)=0THE
NC=1ELSEC=0
4810 GOSUB8200:PAINT(X,Y),,C:GOT
O4800
5000 KE$="ALL":LE=36
5010 GOSUB9000:IFY<48THENPUT(81,
1)-(95,15),A,NOT:GOTO740ELSEIFX=
0THENX=1
5020 GOSUB8200:GOSUB11000:GOTO50
10
5200 IFPN=1THEN730ELSEPUT(97,1)-
(111,15),A,NOT:PUT(97,17)-(111,3
1),A,NOT:GOSUB8200:PN=1:GOSUB800
0:GOTO730
5400 GOSUB9000:IFY<48THENGOSUB85
00:GOTO740ELSEGOSUB8200:XX=X:YY=
Y
5410 GOSUB8000:GOSUB9400:LINE(XX
,YY)-(X,Y),PSET:IFFB=&HFE THEN54
10ELSE5400
5600 GOSUB9000:IFY<48THENGOSUB85
00:GOTO740ELSEXX=X:YY=Y:GOSUB820
0
5610 GOSUB9400:LINE(XX,YY)-(X,Y)
,PSET:IFFB=&HFE THENA=0:GOTO5620
ELSEGOSUB8000:GOTO5610
5620 A=A+1:GOSUB9400:IFFB=&HFE A
NDA<10THEN5620ELSEIFA<10THENGOSU
B8200:GOTO5610ELSE5630
5630 PLAY"C":GOSUB9400:IFFB=&HFE
 THEN5630ELSE5600
5800 GOSUB9000:IFY<48THENPUT(49,
17)-(63,31),A,NOT:GOTO740ELSEGOS
UB8200:XX=X:YY=Y
5810 X=JOYSTK(0):Y=JOYSTK(1):IFX
X+X>255THENX=255-XX
5820 IFYY+Y>191THENY=191-YY
```

```
5830 LINE(XX,YY)-(XX+X,YY+Y),PRESET,B:LINE-(XX,YY),PSET,B:FB=PEEK(&HFF00)OR&H80:GOSUB8000:IFFB=&HFE THEN5810ELSEGET(XX,YY)-(XX+X,YY+Y),GP,G:FORA=1TO4:PUT(XX,YY)-(XX+X,YY+Y),GP,NOT:NEXT:PUT(49,17)-(63,31),A,NOT:GX=X:GY=Y:GOTO730
6000 GOSUB8200
6010 GOSUB9200:IFX+GX>255THENX=255-GX
6020 GET(X,Y)-(X+GX,Y+GY),A,G:ONPM GOSUB6040,6050,6060,6070,6080:IFFB<>&HFE THENPUT(X,Y)-(X+GX,Y+GY),A,PSET
6030 GOTO6010
6040 PUT(X,Y)-(X+GX,Y+GY),GP,PSET:RETURN
6050 PUT(X,Y)-(X+GX,Y+GY),GP,PRESET:RETURN
6060 PUT(X,Y)-(X+GX,Y+GY),GP,AND:RETURN
6070 PUT(X,Y)-(X+GX,Y+GY),GP,OR:RETURN
6080 PUT(X,Y)-(X+GX,Y+GY),GP,NOT:RETURN
6200 POKE178,0:POKE179,3
6210 GOSUB9200:IFX>240THENX=240
6220 IFY>176THENY=176
6230 GET(X,Y)-(X+15,Y+15),A,G:LINE(X,Y)-(X+15,Y+15),PRESET,B:LINE(X,Y)-(X+15,Y+15),PSET,B:PUT(X,Y)-(X+15,Y+15),A,PSET:IFFB<>&HFE THEN6210ELSEGOSUB8200:X1=X:Y1=Y
6240 SCREEN,0:PCLS:LINE(12,12)-(146,146),PSET,B:LINE(11,11)-(147,147),PSET,B:LINE(16,160)-(72,176),PSET,B:LINE(88,160)-(144,176),PSET,B:LINE(190,30)-(209,49),PSET,B:LINE(190,94)-(209,113),PSET,B:LINE(0,0)-(255,191),PSET,B:LINE(1,1)-(254,190),PSET,B
6250 DRAW"BM57,3":S$="MAGNIFY":GOSUB10000:DRAW"BM31,165":S$="Done":GOSUB10000:DRAW"BM96,165":S$="Cancel":GOSUB10000:DRAW"BM181,56":S$="Before":GOSUB10000:DRAW"BM191,120":S$="Now":GOSUB10000
6260 PUT(192,32)-(207,47),A,PSET:PUT(192,96)-(207,111),A,PSET:FORY=32TO47:YY=(Y-32)*8+16:FORX=192TO207:XX=(X-192)*8+16:IFPPOINT(X,Y)=0THENLINE(XX,YY)-(XX+6,YY+6),PSET,BF ELSELINE(XX,YY)-(XX+6,YY+6),PRESET,BF
6270 NEXTX,Y
```

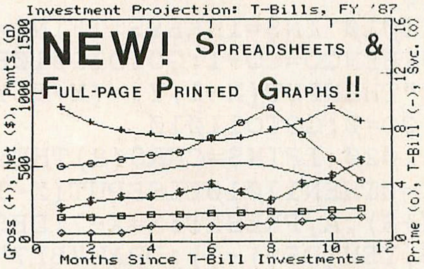
GRAFPLOT

NEW! — THE BEST JUST GOT BETTER!

GRAFPLOT DEMO:
$5.00 DISK & TAPE
REFUND W/PURCHASE
"A GREAT PACKAGE
GETS EVEN BETTER"
- RAINBOW

30 DAY
UNCONDITIONAL
MONEY-BACK
GUARANTEE!!

RAINBOW CERTIFICATION SEAL



- ✱ AUTOMATICALLY LOADS DATA FROM MOST POPULAR SPREADSHEETS.
- ✱ 291 GRAPHING SYMBOLS AND UNLIMITED OVERLAY OF DATA.
- ✱ AUTOMATICALLY SCALES AND LABELS ALL THREE OF THE AXES.
- ✱ CALCULATES MATH FUNCTIONS, INTEGRALS AND MOVING AVERAGES.
- ✱ FULLY AUTOMATIC, MENU DRIVEN W/ COMPLETE ERROR TRAPPING.
- ✱ FULL-PAGE SCREENPRINTS ON ANY PRINTER: SPECIFY WITH ORDER.

REQUIRES 32K EXT. BASIC: TAPE - $40.00 DISK - $45.00

NEW!! PRINTER *Picture Perfect* NEW!! UTILITY

UNIVERSAL SCREENPRINT PROGRAM

- ✱ GET "PICTURE PERFECT" FULL-PAGE PRINTOUTS EVERY TIME!
- ✱ "PERFECTLY SIMPLE" TO OPERATE - "SIMPLY PERFECT" RESULTS!
- ✱ "PERFECTLY COMPATIBLE" WITH ALL DOT MATRIX PRINTERS!
- ✱ GET "PERFECT CONTROL" OF: HEIGHT, WIDTH, POSITION, BAUD RATE, DOT DENSITY, NEGATIVE IMAGES, ETC.
- ✱ THE "PERFECT SOLUTION" TO YOUR GRAPHICS PRINTING NEEDS!
- ✱ COMPATIBLE WITH GRAPHICOM AND COCO MAX PICTURES!

✦ ONLY $25.00 ON DISK OR TAPE ✦

BUY BOTH PROGRAMS & SAVE $10.00

CALL NOW FOR FREE INFORMATION (415) 547-7557, OR WRITE:

HAWKES RESEARCH SERVICES: 859 STANFORD AVE, OAKLAND, CA 94608
YOUR PERSONAL CHECK IS WELCOME! SHIPMENT WITHIN 48 HOURS!
ADD $3.00 SHIPPING ON ALL ORDERS. CA. RESIDENTS ADD SALES TAX

THE SOFTWARE HOUSE

A DIVISION OF DATAMATCH, INC.

DATAMATCH
"FLIPPYS"
DS/DD-2 NOTCHES-2 ID HOLES
10/$9.95 100/$95.00

DATAMATCH DISKETTES
SINGLE SIDE/DOUBLE DENSITY
10/$9.00 100/$85.00

PROGRAMMER'S DISKS
SS/DD 10/$8.00 100/$75.00
DS/DD 10/$9.00 100/$85.00

ALL DISKS COME WITH TYVEK SLEEVES, LABELS, W.P.TABS

HEAT TRANSFER (IRON-ON) RIBBONS
BLACK - RED - BLUE - YELLOW
GEMINI/OKI PRINTERS $5.95 EA.

COLOR RIBBONS: Red, Green, Blue, Brown

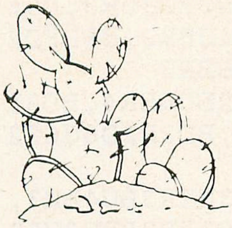
GEM/OKI	4/$10.00
EPSON	4/$24.00
APPLE/NEC	4/$24.00

ALL ITEMS 100% GUARANTEED!
Add $2.50 S/H in U.S.A - Canada Add $3.50
Michigan Residents Add 4% Sales Tax
Send check or money order payable to:

THE SOFTWARE HOUSE
9020 Hemingway, Redford, MI 48239
(313) 937-3442

VISA
Send Card Number and Exp. Date
Min. Charge Order $20.00
MasterCard

```
6280 GOSUB9000:IFX>142ORX<16ORY<
16ORY>176THEN6280ELSEIFY<144THEN
X=INT((X-16)/8):Y=INT((Y-16)/8):
XX=X*8+16:YY=Y*8+16:PUT(XX,YY)-(
XX+6,YY+6),A,NOT:PUT(X+192,Y+96)
-(X+192,Y+96),A,NOT:GOTO6280
6290 IFY<160ORY>176OR(X>93ANDX<8
8)THEN6280ELSEIFX>87THENGET(192,
32)-(207,47),A,G:PUT(192,96)-(20
7,111),A,PSET:GOTO6260ELSEGET(19
2,96)-(207,111),A,G:GOSUB8500:GO
SUB8000:PUT(X1,Y1)-(X1+15,Y1+15)
,A,PSET:X=80:Y=16:GOTO770
6400 IFPN=2THEN730ELSEPUT(97,1)-
(111,15),A,NOT:PUT(97,17)-(111,3
1),A,NOT:GOSUB8200:PN=2:GOSUB800
0:GOTO730
8000 FORP=PN TOPN+2:PCOPYP TOP+6
-PN:NEXT:RETURN
8200 FORP=6TO8:PCOPYP TOP-6+PN:N
EXT:RETURN
8500 PUT(0,0)-(255,47),ME:POKE17
8,FC:POKE179,BC:LINE(116,12)-(14
6,28),PSET,BF:DRAW"BM178,4NL24NG
17ND24M157,13M178,4M169,26":LINE
(188,13)-(250,27),PRESET,BF:IFPN
=1THENPUT(97,1)-(111,15),A,NOT:R
ETURNELSEPUT(97,17)-(111,31),A,N
OT:RETURN
8800 GOSUB9400:S=INT(Y/3/(63/N))
:GOTO8830
8810 GOSUB9400:S=INT(Y/3/(63/N))
:IFFB<>&HFE THENS=S+1:PUT(XX+2,P
*10+51)-(XX+76,P*10+60),A,NOT:RE
TURNELSEIFS=P THEN8810
8820 PUT(XX+2,P*10+51)-(XX+76,P*
10+60),A,NOT
8830 PUT(XX+2,S*10+51)-(XX+76,S*
10+60),A,NOT:P=S:GOTO8810
9000 GOSUB9400:GOTO9020
9010 GOSUB9400:PUT(XX,YY)-(XX+4,
YY+4),A,PSET:IFFB=&HFE THENRETUR
N
9020 GET(X,Y)-(X+4,Y+4),A,G:IFPP
OINT(X,Y)>0THENPUT(X,Y)-(X+4,Y+4
),AR,PSET ELSEPUT(X,Y)-(X+4,Y+4)
,AR,PRESET
9030 XX=X:YY=Y:GOTO9010
9200 GOSUB9400:IFY>47THENRETURNE
LSE9220
9210 GOSUB9400:PUT(XX,YY)-(XX+4,
YY+4),A,PSET:IFY>47THENRETURN
9220 GET(X,Y)-(X+4,Y+4),A,G:IFPP
OINT(X,Y)>0THENPUT(X,Y)-(X+4,Y+4
),AR,PSET ELSE PUT(X,Y)-(X+4,Y+4
),AR,PRESET
9230 IFFB=&HFE THENPUT(X,Y)-(X+4
,Y+4),A,PSET:GOSUB8500:GOTO740EL
SEXX=X:YY=Y:GOTO9210
9400 IFPEEK(&H155)+PEEK(&H156)+P
EEK(&H157)+PEEK(&H158)<&H3F8 THE
NGOSUB9500
9410 X=JOYSTK(0)*4+XO:Y=JOYSTK(1
)*3+YO:FB=PEEK(&HFF00)OR&H80:RET
URN
9500 IF(PEEK(341)=247ORPEEK(341)
=246)ANDYO>0THENYO=YO-1
9510 IF(PEEK(342)=247ORPEEK(342)
=246)ANDYO<2THENYO=YO+1
9520 IF(PEEK(343)=247ORPEEK(343)
=246)ANDXO>0THENXO=XO-1
9530 IF(PEEK(344)=247ORPEEK(344)
=246)ANDXO<3THENXO=XO+1
9540 FB=PEEK(&HFF00)OR&H80:IFFB=
&HFE THENP=254ELSEP=255
9550 FORA=&H155 TO&H158:POKEA,P:
NEXT:RETURN
9800 DRAW"BM"+STR$(X)+","+STR$(Y
):S$="Yes   No":GOSUB10000
9810 A=JOYSTK(0):IFA<32THENPOKE1
78,0:POKE179,3ELSEPOKE178,3:POKE
179,0
9820 LINE(X-1,Y+8)-(X+20,Y+8),PS
ET:LINE(X+40,Y+8)-(X+55,Y+8),PRE
SET:IF(PEEK(&HFF00)OR&H80)=&HFE
THENPOKE178,FC:POKE179,BC:RETURN
ELSE9810
10000 FORA=1TOLEN(S$):DRAWCH$(AS
C(MID$(S$,A,1))-32)+EX$:NEXT:RET
URN
11000 DRAW"BM"+STR$(X)+","+STR$(
Y)+"LD8RU8RD8RU8RD8RU8RD8U8L5":G
ET(X-1,Y)-(X+5,Y+8),A,G:IN$=INKE
Y$
11010 IN$=INKEY$:IFIN$=""ANDCO<1
0THENCO=CO+1:GOTO11010ELSEIFIN$=
""THENPUT(X-1,Y)-(X+5,Y+8),A,NOT
:CO=0:GOTO11010
11020 IFIN$=CHR$(8)THENIFLEN(DE$
)=0THEN11010ELSEPUT(X-1,Y)-(X+5,
Y+8),A,PRESET:X=X-7:DE$=LEFT$(DE
$,LEN(DE$)-1):DRAW"BL7":PUT(X-1,
Y)-(X+5,Y+8),A,PSET:GOTO11010
11030 IFIN$=CHR$(13)THENPUT(X-1,
Y)-(X+5,Y+8),A,PRESET:IN$=DE$:DE
$="":RETURN
11040 IFASC(IN$)<31ORLEN(DE$)=LE
 ORIN$=CHR$(95)ORX>242 THEN11010
11050 IFKE$<>"ALL"THENIFINSTR(KE
$,IN$)=0THENSOUND1,1:GOTO11010
11060 PUT(X-1,Y)-(X+5,Y+8),A,PRE
SET:DRAWCH$(ASC(IN$)-32):DE$=DE$
+IN$:X=X+7:PUT(X-1,Y)-(X+5,Y+8),
A,PSET:GOTO11010
12000 DATA BR7,BR2D4BD2D0BU6BR5,
BRDBR2UBR4,BD2R4HD4EL4FU4BUBR6,B
R4BDL4D2R4D2L4R2DU6BR5,DRUBR3DG4
DBR3URDBU6BR3,BRRFG3DFRE2BD2H4UB
```



PRICKLY-PEAR SOFTWARE

QUALITY PROGRAMS FOR YOUR COCO & TDP-100

PROGRAMS REQUIRE 16K EXTENDED BASIC FOR TAPE, AND 32K DISK UNLESS OTHERWISE NOTED.

HALL OF THE KING (Rainbow Review 6/86)

This program combines all the things you look for in a great two disk graphics adventure program. The Hi-Res graphics are superbly done. The text portion of the screen and the graphics change quickly as you move through the **HALL OF THE KING.** You can move freely from one portion of the adventure to another. Call up your inventory at any time. You can even save or load a game at ANY time. **HALL OF THE KING** will challenge even the most seasoned adventurer.

HALL OF THE KING requires 64K EB and one disk drive. This exciting two disk adventure comes packaged in a vinyl case. **$39.95.**

HALL OF THE KING II — THE INNER CHAMBER

Continue your quest for the Earthstone in The Inner Chambers of the **HALL OF THE KING.** Outstanding graphics help show the way to success in your search to help restore the legendary power of the Earthstone to the dwarven race. The deeper you travel into the inner chambers, the more difficult your progress becomes. **HALL OF THE KING II** has all the fine features of the first adventure. It is designed to follow the original **HALL OF THE KING** but may be played as a stand-alone adventure. The adventure fills two disks and comes packaged in a handsome vinyl folder. It requires one disk drive and 64K. **$39.95**

WARP FACTOR X (Rainbow Review 2/86)

If you have been waiting for a game for your color computer that has everything, your wait is over. **WARP FACTOR X** is here. This all graphics simulation game requires strategy, fast thinking, an eye for detail, and above all experience in knowing the capabilities of your starship and its computer. (See review in Feb. 85 issue of Rainbow.) It requires 32K one disk drive and comes packaged in a vinyl library case. **$34.95**

DARKMOOR HOLD (Rainbow Review 8/86)

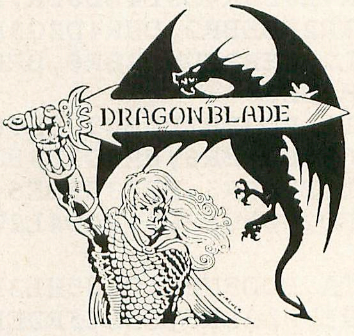
You and your comrades will explore the levels of Darkmoor Hold in an effort to gain great riches and defeat the dark wizard. The Wizard will soon realize the threat you pose and the many monsters you meet and battle will become stonger and more powerful as you move through the 10 levels of Darkmoor. A keen eye will help you find weapons and armor to aid your battle along with treasures for you to keep. Your party consists of a Dwarf, an Elf, and you, the Human, each with their own special attributes. The weapons, armor and treasure are placed randomly in each level to provide a new challenge each time you play. You may also save the game you are playing since defeating the evil Wizard is not an easy task. It has great graphics and an impressive text screen to give you more fun than a barrel of elves. Requires 64KEB and 1 disk drive. **$29.95**

POLICY ON PROTECTION

We believe our customers are honest — all of our software can be backed up using standard backup procedures.

Your Personal check is welcome - no delay. Include $1.50 shipping for each order. TX residents add 5 1/8% sales tax. Orders shipped within two days.

Dealer and author inquiries are always welcome. Canadian dealers should contact Kelly Software Distributors, Ltd. 608, STNT, Calgary, Alberta T5H 2H2, (403) 236-2161



DRAGON BLADE
Animated Graphics Adventure

This 100% hi-res graphics adventure features many animated screens which will delight the avid adventurer. You search for the magic Blade which is the only way to rid your homeland of the fearsome dragon which has risen from a long rest to terrorize your village. Fill your screen with super graphics as you try to solve the difficult challenge the village leaders have set before you. Dragon Blade requires 64K EB and 1 disk drive. **$29.95**

UTILITIES

RTD Trio — Take advantage of this special offer. This package of three utility programs includes our new DISK TO TAPE, TAPE TO DISK (version 2.0), and ROMFREE (version 2.0). TAPE TO DISK moves BASIC, ML and DATA files from tape to disk automatically — one program or an entire tape. It even fixes those programs that load at hex 600 so they work on a disk system. ROMFREE moves ROM packs to tape or disk easily, and fixes them so you just load and EXEC. ROMFREE now accomodates the larger 16K ROM packs. You won't believe how easy it is to protect your software library! These programs are shipped on tape. Requires 16K. **$49.95 ($24.95** each if purchased separately)

Prickly Pear Maillist — Ver. 2.0 — You won't find a mailing list program anywhere that will out-perform this one. Req. 32K and one disk drive. Only **$29.95**

STATISTICS

Lizpac — Absolutely the most complete statistics package we have seen for ANY computer anywhere. Lizpack is 850,000 Bytes of programming filing 7 disks with an eighth disk containing data files to be used in the examples. The 200 page manual completely explains all that Lizpac has to offer. It is user friendly. Send for more information. Req. 32K disk only. **$195.00**

Send for our free catalog

Call (915) 584-7784 or

Send Order To: **PRICKLY-PEAR SOFTWARE**
213 La Mirada
El Paso, Texas 79932

```
UBR7,BRDRUBR5,BR3G2D2F2BU6BR4,BR
F2D2G2BU6BR6,BD3R4BD2H4BD4E4BUBR
3,BD3R4BG2U4BUBR5,BD6BR2GBU7BR6,
BD3R4BU3BR3
12010 DATA BD6BR2R0BU6BR5,BD6UE4
UBR3,BDD4FR2EU4HL2BD3BRR0BE3BR2,
BR2D6RL2BU5EBR5,BDER2FDG4R4BU6BR
3,BDER2FDGL2R2FDGL2HBE5BR2,D3R4L
D3U6BR4,R4L4D3R4D3L4BE6BR,BDD4FR
2EUHL2BU3R2FBEBR2,DUR4D2G3DBE6,B
DDFR2FDGL2HUER2EUHL2BR6,BRR2FD4G
L2HBU4DFR3BE3
12020 DATA BD3BR2D0BD3U0BU6BR5,B
D3BR2D0BD3GBU7BR6,BR3G3F3BU6BR4,
BD2R4BD2L4BE4BR3,BRF3G3BE6,BD2UE
R2FD2L2DBD2U0BU6BR5,R4D4L2U2R2BD
4L4U6BR7
12030 DATA BDD5U2R4D2U5HL2BR6,D6
R3EUHL2R2EUHL2BR6,BDD4FR2EBU4HL2
BR6,D6R2E2U2H2LBR6,D3R3L3D3R4BU6
L4BR7,D6U3R3L3U3R4BR3,BDD4FR2EU2
L2R2BU2HL2BR6,D6U3R4D3U6BR3,R4L2
D6L2R4BU6BR3,BD4DFR2EU5BR3,D6U3R
F3H3E3BR3,D6R4BU6BR3,D6U5RFDUERD
5U6BR3
12040 DATA D6U5RFD2F2U6BR3,BDD4F
R2EU4HL2BR6,D6U3R3EUHL2BR6,BDD4F
REHF2HEU3HL2BR6,D6U4F4H3R2EUHL2B
R6,BDDFR2FDGL2HBE4HL2BR6,R2D6U6R
2BR3,D6R4U6BR3,D3FDFEUEU3BR3,D5F
EUDFEU5BR3,DF4DBL4UE4UBR3,DFDFD2
U2EUEUBR3,R4DG4DR4BU6BR3
12050 DATA BRR2L2D6R2BU6BR4,BD8L
R6BU8BR2,BRR2D6L2BE6,BD2E2D6U6F2
BU2BR3,BL7,BR7
12060 DATA BD2R3FD3L3HER3BU4BR3,
D6R3EU2HL2BU2BR6,BD3D2FR2EBU2HL2
BU2BR6,BD3D2FR3U4L3R3U2BR3,BD3DR
4UHL2GD2FR3BU6BR3,BD3R3L2D3U5ERF
BEBR2,BD3D2FR3DGL3BR4BUU5L3R3BU2
BR3,D6U4R3FD3BU6BR3,BDBR2D0BD2D3
BU6BR5,BD7FR2EU4BU2U0BUBR3,D6U3F
3H2E2BU2BR4
12070 DATA BR2D6RBU6BR4,BD2D4U4R
2D4U4RFD3BU6BR3,BD2D4U4R3FD3BU6B
R3,BD3D2FR2EU2HL2BU2BR6,BD2D6U2R
3EU2HL2BU2BR6,BD3D2FR3D2U6L3BU2B
R6,BD2D4U2E2R2BU2BR3,BD3FR2FGL3B
E4L3BU2BR6,BD2R2LU2D5FEBU5BR4,BD
2D3FR2EU3BU2BR3,BD2DFDFEUEUBU2BR
3,BD2D3FEUDFEU3BU2BR3
12080 DATA BD2F4H2G2E4BU2BR3,BD2
DFDFG2E3UEUBU2BR3,BD2R4G4R4BU6BR
3
13000 DATA0,3,12,15,48,51,60,63,
192,195,204,207,240,243,252,255
```

★★★★★★ SELECTED SOFTWARE ★★★★★★★

SOLDERLESS UPGRADE KITS
With easy-to-follow instructions

64K FOR E BOARD	$39.95
64K FOR F BOARD	$29.95
64K FOR COCO2* (ALL MODELS)	$29.95
EXTENDED BASIC CHIP	$34.95

*All Korean models require one solder joint
Please specify model # with order

NOTE: All ICs used in our kits are first quality 150 NS prime chips and carry one full year warranty.

COCO MAX tape only	$64.95
COCO MAX II disk only	$74.95
Y-BRANCHING CABLE	$27.95
DS-69A DIGISECTOR & C-SEE III SOFTWARE	$149.95
HJL-57 KEYBOARD	$69.95
THE INTRONICS EPROM Programmer Program Up to 64K x 8 Eprom	$139.95
DATARASE (Eprom Eraser)	$39.95
2764 HIGH SPEED COMPATIBLE	$5.95
27128 HIGH SPEED COMPATIBLE	$7.95
ROM PACK P.C. BOARD with case for 27xx	$9.95
TEAC 55B or Fujitsu M2551A DS/DD ½ Height Drive	$109.95
2 DRIVE with Case and Power Supply	$269.00
JFD-CP Disk Controller with JDOS 1.2	$129.00

10 DS/DD DISKETTE w/sleeve & label	$9.95
Diskette Carousel	$24.95
300 Baud Modem Direct Connect*	$49.95
*With Autoterm on tape (Disk add $5.00)	$64.95
1200 Baud Modem Auto Answer/Dial**	$119.95
**With Autoterm on tape (Disk add $5.00)	$149.95
Modem Cable	$12.95
VIDEO PLUS IIC	$34.95
VIDEO PLUS IIU	$34.95
REAL TALKER I With 3 talking games	$49.95
REAL TALKER II With 3 talking games	$54.95
NUMBER JACK THE HJL Numeric Key Pad	$79.95

WIZARD'S CASTLE
64K Graphic Adventure
By Spectral Associates
Disk only $19.95

TeleWriter 64
Telepatch II
$74.95 (Disk Version)

Top 5 Spectral Associates
games in one package:
Galagon, Lancer, Cubix,
Froggie & Lunar Rover Patrol
for only $34.95 tape or disk

BASIC ROMs DISASSEMBLY

COLOR BASIC UNRAVELLED	$17.95
EXTENDED BASIC UNRAVELLED	$17.95
DISK BASIC UNRAVELLED	$17.95
ALL 3 BOOKS	ONLY $39.95
ULTRA 80C DISK EDITOR ASSEMBLER	$29.95
BUG OUT & THE ORACLE (M.L. Monitor)	$14.95
ALL 5 ITEMS	ONLY $59.95
500 POKES, PEEKS, 'N EXECS	$16.95
UTILITY ROUTINE (VOLUME 1)	$19.95
WITH ROUTINES ON TAPE OR DISK	$36.95
ASSEMBLY LANGUAGE PROGRAMMING (TEPCO)	$16.95
ALL 9 ITEMS	ONLY $119.95

★ LOW PRICES ★ FAST SERVICE ★ FREE SHIPPING ★

	TAPE	DISK
DYNACALC		$69.95
PROCOLOR FILE 2.1		$49.95
MASTER DESIGN		$24.95
TELEWRITER 64	$39.95	$49.95
SUPER SCREEN MACHINE	$35.95	$38.95
RAINBOW SCREEN MACHINE	$23.95	$26.95
PEN PAL 2.1		$84.95
AUTOTERM	$31.95	$39.95
ADOS		$27.95
SUPER BACKUP UTILITY		$44.95
THE PEEPER WITH SOURCE	$24.95	$26.95
GRAPHICOM		$19.95
BEST OF COCO TIME 85	$26.95	$26.95
UTILITIES BONANZA I		$29.95
DISK UTILITIES 2.1A		$24.95
TELEPATCH II		$29.95

	TAPE	DISK
P51 MUSTANG	$26.95	$29.95
SAILOR MAN (64K)	$26.95	$29.95
WORLDS OF FLIGHT	$26.95	$29.35
DRAGON SLAYER		$23.95
SR-71	$26.15	$29.75
BUZZARD BAIT	$19.95	$22.95
GALAGON	$19.95	$21.95
LUNAR ROVER PATROL	$19.95	$21.95
MS GOBBLER	$19.95	$21.95
LANCER	$19.95	$21.95
CUBIX	$19.95	$21.95
FROGGIE	$19.95	$21.95
SPACE PAC (10 M.L. GAMES)	$21.95	$21.95
EDUCATIONAL PAC (6 PROGRAMS)	$19.95	$19.95
ADVENTURE PAC (5 GAMES)	$19.95	$19.95
TREASURY PAC (30 GAMES)	$29.95	$29.95

WE PAY SHIPPING in the United States, Canada & Mexico. Overseas please add 10%. (MN Residents add 6% sales tax.) We accept Visa, Mastercard, check or money order. U.S. funds only for foreign orders. C.O.D. please add $2.00. (USA only).

Send to: SELECTED SOFTWARE
P.O. Box 32228, Fridley, MN 55432
24 HOUR ORDER LINE 612-757-2439
INFORMATION 612-757-1026 (11 A.M. - 5 P.M. C.S.T.)
24 HOUR SHIPPING

Learning How To Function in Basic

By Joseph Kolar
Rainbow Contributing Editor

Last month, we used the `MID$` and `LEN` functions on the inverse, black screen, but we didn't hurt ourselves explaining them in detail.

To make amends, we shall repair this neglect and work with `LEN`, `LEFT$` and `RIGHT$`. We are going to use the `MID$` that complements `LEFT$` and `RIGHT$`. Keep in mind that there is another form of `MID$` (a statement as opposed to a function).

We'll toy around with the regular green screen and create some interesting effects that may be of use in your programming future.

The first order of business is to give an overview of `LEN`, `LEFT$`, `RIGHT$` and `MID$`. Look at Listing 1. Key in lines 10, 20 and 100. The meat is in Line 20. We plan to display a title on the text screen — a centered name and address heading.

The entire text was enclosed, within quote marks, in one long string of letters, numerals and blank spaces. The strung-out line was assigned a name, string variable A$. The three lines of the title were scrambled and blank spaces separating the lines were omitted by personal choice.

Key in Line 30. `L` is the variable assigned to `LEN(A$)`, the length or number of characters/spaces in the string A$.

It was chosen to display this value to achieve a dual purpose. First, to locate it in the center of the screen as a centering guide. The two-digit value begins on the 15th space. (Remember the first line is 0, not 1.) Secondly, I was curious to know how many characters/spaces there were in A$.

The top line of desired text is buried in the middle of string A$, so we may as well fetch it, using `MID$` as our appropriate tool.

Key in Line 40. Picking a location on the second row, I unimaginatively chose 32 at the left margin. Later, it would be centered. `MID$`, the target text, was the first of three values to be enclosed within parentheses. Counting from the first character in the string until reaching `J` (the beginning of the segment of text to be plucked out of A$), gave the second value to be added to A$, and separated from it by a comma. Next, counting from the first letter `J`, the number of characters/spaces to be included (totaling 12), became the third value, again separated from the second value by a comma. Don't forget to tack on the closing parenthesis.

Now run it. Notice that it lines up along the left margin.

The address is next and, since it is at the right end of string A$, it is a candidate for `RIGHT$`. Key in Line 50. The locating value, 64, was chosen, although any reasonable value near the left margin would have been fine, say from 64 through 70. `RIGHT$` contains two items enclosed within parentheses. The first is the target string, A$. Since all of the characters/spaces at the right end of the string would be utilized to create the second line of text, the total number of characters/spaces making up the second entry would be found by counting backwards, beginning with `T`, up to and including one. If you prefer, count from one to `T`, but it would be best to work from right to left. The value is separated by a comma from A$. In other words, the last 21 characters/spaces will be displayed on the row. Run this.

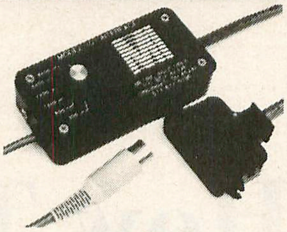
Now, since the balance of our text appears at the beginning of Line 20, the `LEFT$` was called upon for help. Key in Line 60. A value of 96 was chosen as the trial location of the third row. `LEFT$` is used about the same as `RIGHT$`, except it works from the left end, or beginning, of A$. The number of letters to be

Florida-based Joseph Kolar is a veteran writer and programmer and specializes in introducing beginners to the powers of CoCo.

Metric Industries

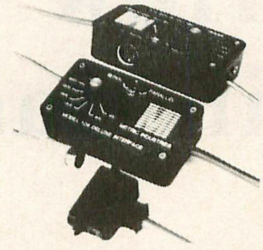
Model 101 Interface $39.95

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). The 101 is only 4″ × 2″ × 1″ and comes with all cables and connectors for your computer and printer.



The Model 104 Deluxe Interface $51.95

The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5″ × 2.5″ × 1.25″ and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.



Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

Cassette Label Package $15.95

Organize Your Tapes, Label Your Data Tapes, Color Code Your Tapes, Label Your Audio Tapes

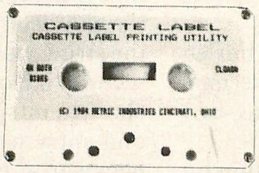
Save!

Save $8.40 when you purchase the Cassette Label program and label package. You get the Cassette Label program, 100 WHITE labels, 100 RED labels, 100 BLUE labels, 100 YELLOW labels, and 100 TAN labels. A value worth $24.35, but you pay only $15.95. When ordering, specify the Cassette Label PACKAGE. Order soon, this offer expires 9/30/86

Cassette Label Program $6.95

New Version 1.2-Tape transferrable to disk. Now save and load Labels from tape or disk.

This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, expanded or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.


CASSETTE LABEL
CASSETTE LABEL PRINTING UTILITY
(C) 1984 METRIC INDUSTRIES CINCINNATI, OHIO

Other Quality Items

High Quality 5 Screw Shell C-10 Cassette Tapes **$7.50 per dozen**

Hard Plastic Storage Boxes for Cassette Tapes **$2.50 per dozen**

Pin Feed Cassette Labels
White **$3.00 per 100**
Colors **$3.60 per 100** (Red, Blue, Yellow or Tan)

VISA MasterCard

THE 101, AND 104 REQUIRE POWER IN ORDER TO OPERATE. MOST PRINTERS CAN SUPPLY POWER TO YOUR INTERFACE. STAR, RADIO SHACK, AND OKIDATA ARE JUST A FEW THAT DO. EPSON DOES NOT. THE INTERFACES CAN ALSO BE POWERED BY AN AC ADAPTER (RADIO SHACK MODEL 273-1431 PLUGS INTO ALL MODELS). IF YOU REQUIRE A POWER SUPPLY, ADD A "P" TO THE MODEL NUMBER AND $5.00 TO THE PRICE. (MODEL 101P $44.95, MODEL 104P $56.95)

The Model 101, 102 and 104 will work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh and many others. They support BASIC print commands, word processors and graphic commands.

We manufacture these products. Dealer inquiries are invited.

To order call our 24 hour order line 513-677-0796 and use your VISA MASTERCARD, request C.O.D. or send check or money order to:

Metric Industries
P.O. Box 42396
Cincinnati, OH 45242

Free shipping on orders over $50.00. Ohio residents add 5.5% sales tax.
Orders under $50.00 please add $2.50 for shipping.

included in this row were tallied, from 1 through zero and this total, 19, became the other value included in `LEFT$`. If you look at the number of characters/spaces used in the last items in `MID$` and `RIGHT$`, and subtract the total from `L`, you can see that every character/space in A$ was accounted for. This doesn't always follow if you have unnecessary spaces or unused characters in the string. Again, run your work.

Take a few minutes and adjust the lines to center them. Take a moment to change the `52-33` in Line 60 to `19`, since the point has been made.

Key in lines 70 and 80. Line 70 waits for any key to be pressed and then Line 80 zaps the top row and in the process says goodbye to 52.

Ordinarily, having no further use for Line 30, it could be deleted — but then there goes the tutorial! Of course, Line 30 could be masked with a `REM` marker, but that too alters the listing.

Look at lines 40 through 60. Are your `PRINT@` values `46`, `69`, `102`, respectively? They need not be exactly the same. So long as the title appears reasonably well-centered to you, that is what counts.

Who wants to practice? Using `MID$`, how would you put on lines 50 and 60? Better still, put your name and address into a single long string and make a nicely centered heading to demonstrate your grasp of the functions.

If you plan to use the material in string A$ more than once, you could assign a variable to the substrings in lines 40, 50 and 60. They will be ready for instant use elsewhere in your program. Insert and run the following:

```
35 A1$=MID$(A$,20,12):A2$=RIGHT
   $(A$,21):A3$=LEFT$(A$,19)
90 PRINT@170,A1$:PRINT@197,A2
   $:PRINT@230,A3$
```

Naturally, you could then substitute the three variables, A1$, A2$ and A3$ for the function statements they represent in lines 40, 50 and 60, respectively. At that point, A$ becomes a dinosaur.

Key in Listing 2 and run it to get an overview. You will note that the text was printed one complete word at a time, repeated monotonously to the screen. The original objective was to afford you practice using `LEFT$`, `RIGHT$` and `MID$`, the idea being to figure out many different ways to accomplish the mission. Seven examples were sufficient to create the text panel to keep the tutorial short and succinct. No doubt, you will e able to find other techniques to get ie job done. I can think of about 20 ariations on this theme. The acid test , your ability to display what you itended in the manner intended by rawing upon CoCo's versatility.

List lines 5 to 50. A word about the LEAR 500. If you masked it with a REM, ou would have quickly determined iat the program works OK. Masked or ot, CoCo already cleared 500 memory ocations. Change Line 5 to CLEAR0 and un it. Again, change Line 5 to CLEAR1 nd run. Repeat this through CLEAR4. n OS Error (out of string space) in ine 30 message appears, because there re five letters in each string of D$ used. hange Line 5 to CLEAR5. The program s in good shape because, coincidentally, every string is composed of five etters.

Restore Line 5 to CLEAR 500, if you ike. On power up, CoCo automatically eserves 200 string spaces.

Whenever working with strings, it is good practice to CLEAR 500. If you vork with many strings or lengthy trings up to about 255 characters/ paces, CoCo may have no places allocated to store them. It cries for guidance vith an OS message. Don't panic! Increase the CLEAR 500 to CLEAR 600 and run. If it still isn't enough space, try a larger figure, until CoCo has enough memory reserved to handle the load you thrust upon it. You will see an example of this in the third tutorial of this series.

Now, let us return to lines 5 through 50. In Line 30, we decided to print BETTY using LEFT$ to pick out of string D$ the first five letters and print them beginning at location eight. Since I am lazy, I used the old reliable semicolon ploy to allow me to butt up the next segment without taxing my brain figuring out PRINT@ locations. A small pause fetched from a GOSUB routine allows time to digest the display momentarily. Then, using MID$, from the same string, beginning with the sixth character/ space and going up to and including the 10th character/space, ANN was appended to BETTY, followed by a semicolon and another pause. Finally, utilizing RIGHT$, the balance of the letters were put on to complete the name followed by a pause of longer duration.

You could have broken up D$ to use the first six characters/spaces in Line 30 and four characters/spaces in Line 40 and still maintain the integrity of the three segment plan of attack. Only one problem. If you left Line 5 at CLEAR5, you got the OS message because there are six characters/spaces in Line 30. OK. Make sure Line 5 reads CLEAR 500. Now run. Can you pick up the error? Failure to change the starting letter in Line 40 from six to seven generated the problem.

Can you break up D$ into some other groups without destroying the presentation, using the same functions? Now is a good time to work something out and become more familiar with the three functions.

Your fertile mind tells you that this is a lot of work to put three equal segments on the screen. True, true.

List lines 70 to 100. To save all the fuss of counting and using LEFT$, etc., in Line 70, we prefabricated the three building blocks and assigned them to separate string variables. Still being naturally lazy, to locate the starting position of the second row of text, it was simple to add 32 to the PRINT@ location usurped from Line 30. In lines 80 to 100, each name was placed exactly as in lines 30 through 50, but with less effort. List Line 100 to compare. Run this. If you were a glutton for punishment, you could revise the strings in Line 70 without altering the presentation in this part of the tutorial. Be careful: The following presentations may get thrown out of kilter.

List lines 120 to 150. Here PRINTTAB was used to get the same results. Note the necessity of the semicolon. If you don't know what will happen when you run without it, pull out the semicolon and run it.

I can't stand that last line at the bottom of the panel. Find the correct program line and edit to center it!

List lines 160 to 180. To place the text in the correct spaces on the next row, without the semicolon ploy, each string must be located individually. OK, now run. Too much calculating! Better that CoCo does the work as in the previous presentation.

In order to return to the subject at hand and clown around with LEFT$, etc., list lines 200 to 220 and see how only MID$ was used to work out the same arrangement. List lines 240 to 300 to see LEFT$ and then RIGHT$ carry the entire load to put on all three segments. Run your work.

Since each of the groups has five characters/spaces, you could use MID$, RIGHT$ and/or LEFT$ interchangeably (not their contents) and get the same results. It is no big deal to use the entire contents of a string when all are the same length.

For practice, in Line 70, add a space to A$, strip off both spaces from B$ and add a leading space to C$. Run.

CoCo is upset! Help CoCo straighten out this mess. First off, compare the distorted lines with the program lines concerned and point out and explain the whys and wherefores of the resultant boo-boos to yourself. Then make the required corrections.

> ***". . . ideas began to perk in my noodle . . ."***

Look how valuable those GOSUB routines are. The short one was used 14 times and the longer one was used seven times.

List lines 320 on. In the third tutorial, we will work on presenting text, using LEFT$, and who knows what else, a letter at a time, in a very attractive, readable manner. Lines 320 and 330 were just plopped onto the screen. Patience — you'll like it!

You may wonder, what value is all this nonsense to me? It is important for a newcomer to become familiar with all the functions, statements and so forth. Knowing all the nuances of CoCo's features allows you a broad option of possibilities when composing a program. The more ways you know to do a job, the more alternatives are available for your creations.

The educational language program you learned how to create and use recently would have been impossible to create without knowing what CoCo could do with LEFT$, MID$ and RIGHT$. Knowing what is possible affords you the choice of following many pathways to a fruitful conclusion.

In fact, in fooling around with these tutorials, ideas began to perk in my noodle and aided me to move from dead center to further enlarge and modify that program.

Notice how in lines 320 and 330 we continue to employ the invisible vertical line gambit to format our text. The point to be emphasized is that what you learn in these tutorials becomes a part of your computing skills and can hereinafter be called forth on demand to create some goodie that is near and dear to your heart. ☐

It's here!

RAINBOW ON DISK!

ANOTHER GREAT SERVICE FROM THE LITTLE ELVES AT THE END OF THE RAINBOW

Remember the story of the cobbler and the elves, when the little people crept into the old man's shop and did all his chores while he slept? Well, there is a monthly chore we can now eliminate for you — transferring RAINBOW ON TAPE to disk!

Now, in addition to RAINBOW ON TAPE, we're offering RAINBOW ON DISK, the perfect companion to RAINBOW magazine for all our readers with disk drives. No more typing. No more transfers. We take care of all the work for you.

OS-9 programs

Thanks to the elfin magic going into RAINBOW ON DISK, part of one side of the disk is formatted for the OS-9 operating system. That means that you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. And, with the introduction of the new CoCo 3, OS-9 programs will become more and more prevalent.

More than two dozen programs

If you're a RAINBOW reader and you have a disk drive, you won't want to go another day without RAINBOW ON DISK. For only $99, 12 full issues of RAINBOW ON DISK will follow the RAINBOW to your door. That's only $8.25 for each disk.

To start your subscription, call our toll-free number or use the handy order card between pages 34 and 35. When your copy of the RAINBOW arrives next month, you can start enjoying the programs without any extra effort. The little people at the end of the RAINBOW will already have taken care of all the work.

SUBSCRIBE NOW AND SAVE AN EXTRA $9!

That's right, you can subscribe to RAINBOW ON DISK between now and January 1, 1987, for only $90* — $9 off the regular subscription price of $99. Order now and receive 12 issues for only $7.50 each!

* Don't miss out. During this special introductory offer, good until January 1, 1987, subscriptions to RAINBOW ON DISK are only $90 a year in the United States (regularly $99). Canadian rate U.S. $100 (regularly $115). All other countries U.S. $115 (regularly $130). RAINBOW ON DISK single copy rate is: $12 within the U.S.; Canadian rate U.S. $14; all other countries U.S. $16. Kentucky residents add 5% sales tax. All subscriptions begin with the current issue unless otherwise specified. Please allow 6 to 8 weeks for first copy. U.S. currency only, please. In order to hold down non-editorial costs, we do not bill.

RAINBOW ON DISK and RAINBOW ON TAPE are not stand-alone products, but are intended as adjuncts and complements to the magazine. Even if you purchase RAINBOW ON DISK or RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions. For information on RAINBOW ON TAPE, see Page 160.

To order by phone (credit card orders only), call 800-847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call 502-228-4492

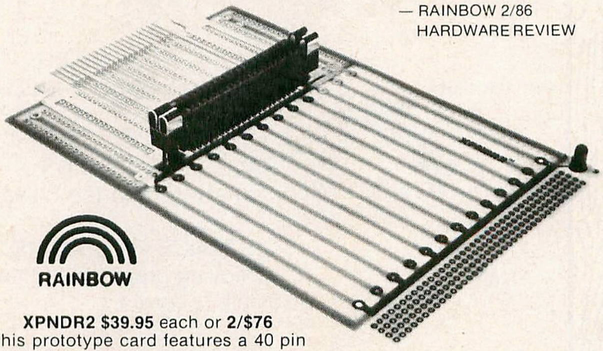
Listing 1: STRINGS1

```
0 '<LISTING1>
10 CLS
20 A$="INVERNESS, FL,32650JOSEPH
 KOLAR1709 DICKINSON STREET"
30 L=LEN(A$):PRINT@14,L;
40 PRINT@32,MID$(A$,20,12)
50 PRINT@64,RIGHT$(A$,21)
60 PRINT@96,LEFT$(A$,52-33)
70 EXEC44539
80 PRINT@0,""
100 GOTO100
```

```
220 ......117
END ......73
```

Listing 2: STRINGS2

```
0 '<LISTING2>
5 CLEAR 500
10 CLS
20 D$="BETTY ANN WHITE"
30 PRINT@8,LEFT$(D$,5);:GOSUB500
40 PRINT MID$(D$,6,5);:GOSUB500
50 PRINTRIGHT$(D$,5):GOSUB600
60 '***
70 A$="BETTY":B$=" ANN ":C$="WHI
TE"
80 PRINT@8+32,A$;:GOSUB500
90 PRINT B$;:GOSUB500
100 PRINT C$:GOSUB600
110 '***
120 PRINTTAB(8)A$;:GOSUB500
130 PRINTTAB(13)B$;:GOSUB500
140 PRINTTAB(17)C$:GOSUB600
150 '***
160 PRINT@8+96,A$:GOSUB500
170 PRINT@13+96,B$:GOSUB500
180 PRINT@18+96,C$:GOSUB600
190 '***
200 PRINT@8+128,MID$(A$,1,5);:GO
SUB500
210 PRINT@13+128,MID$(B$,1,5);:G
OSUB500
220 PRINT@18+128,MID$(C$,1,5):GO
SUB600
230 '***
240 PRINT@8+160,RIGHT$(A$,5):GOS
UB500
250 PRINT@13+160,RIGHT$(B$,5):GO
SUB500
260 PRINT@18+160,RIGHT$(C$,5):GO
SUB600
270 '***
280 PRINT@8+192,LEFT$(A$,5);:GOS
UB500
290 PRINT@13+192,LEFT$(B$,5);:GO
SUB500
300 PRINT@18+192,LEFT$(C$,5):GOS
UB600
310 '***
320 PRINT:PRINT"  USING THE THRE
E VARIABLES, A$;B$;C$; YOU CAN C
ENTER THE NAME, WITH PREGNANT PA
USES BETWEEN    VARIABLES, USING
 A VARIETY OF   TECHNIQUES.
330 PRINT:PRINT"  SOME ARE A WAS
TE OF TIME!"
340 GOTO 340
500 FOR Z=1TO200:NEXT:RETURN
600 FORZ=1TO500:NEXT:RETURN
```



"XPNDR2 and SuperGuide - an Ideal Expansion Card Set"

— RAINBOW 2/86 HARDWARE REVIEW

RAINBOW

XPNDR2 $39.95 each or **2/$76**
This prototype card features a 40 pin connector for projects requiring an on-line disk system or ROM paks. The CoCo signals are brought out to wire-wrap pins. Special gold plated spring clips provide reliable and noisefree disk operation plus solid support for vertical mounting of the controller. The entire 4.3×7 inch card is drilled for ICs. Assembled, tested and ready to run.

XPNDR1 $19.95 each or **2/$36**
A rugged 4.3×6.2 inch bare breadboard that brings the CoCo signals out to labeled pads. Both XPNDR cards are double-sided glass/epoxy, have gold plated edge connectors, thru-hole plating and are designed with heavy power and ground buses. They're drilled for standard 0.3 and 0.6 inch wide dual in-line wirewrap sockets; with a 0.1 inch grid on the outboard end for connectors.

SuperGuide $3.95 each
Here is a unique plastic insert that aligns and supports printed circuit cards in the CoCo cartridge port. Don't forget to **ORDER ONE FOR YOUR XPNDR CARDS.**

Included with each XPNDR card are 8 pages of APPLICATION NOTES to help you learn about chips and how to connect them to your CoCo.

VISA

To order or for technical information call:

(206) 782-6809

weekdays 8 a.m. to noon

We pay shipping on prepaid orders. For immediate shipment send check, money order or the number and expiration date of your VISA or MASTERCARD to:

ROBOTIC MICROSYSTEMS

BOX 30807 SEATTLE, WA 98103

Computer Island Educational Software

FIRST GAMES 32K Ext. $24.95 tape $29.95 disk
First Games contains 6 menu driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lower case letters, shapes, memory, visual discrimination and counting.

ARROW GAMES 32K Ext. $21.95 tape $26.95 disk
Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys ONLY. Games include: LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

MATH INVADERS 32K Ext. $17.95 tape $22.95 disk
A multi-level "Space Invaders" type game to reinforce the 4 basic math operations (addition, subtraction, multiplication and division). Problems become more difficult as you progress. Hi-res graphics. Joystick required.

COCO WHEEL OF FORTUNE 32K Ext. $19.95 tape $24.95 disk
Hi-res graphics and screen in this version of the popular TV show. One to six players. Spin the wheel for points and guess a letter to solve the puzzle. Over 200 puzzles. Have fun while strengthening language arts skills.

DOLLARS & SENSE 16K Ext. $14.95 tape $19.95 disk
Learn to make purchases. Graphic displays of items Kids love. Player buys items using dollars and coins to practice using money correctly. Solutions given.

$$$

McCOCO'S MENU 16K Ext. $14.95 tape $19.95 disk
America's favorite pastime - going out to eat. Learn to buy and add up your purchases from a typical fast food restaurant menu. Gain skill in using money. Different prices each time.

AREA & PERIMETER 32K Ext. $19.95 tape $24.95 disk
Triangles, rectangles, and circles are covered in this Hi-res text and graphics program.

see us at RAINBOWfest PRINCETON

SALES & BARGAINS 32K Ext. $19.95 tape $24.95 disk
Learn to find the discounted price. Hi-res text and beautiful graphics.

DISTANCE PROBLEMS 32K Ext. $19.95 tape $24.95 disk
Moving graphics and text combined on a Hi-res screen. Rate x Time equals Distance in all its forms.

OPENING A BANK ACC'T 32K Ext. $24.95 disk only
A set of programs designed to introduce and provide practice in the skills of filling out bank applications, deposit and withdrawal slips, and computing bank account balances. Loaded with graphic presentations. Grade 3-6.

RAINBOW
CERTIFICATION
SEAL

Computer Island

(718) 948-2748

VISA

Dept. R 227 Hampton Green, Staten Island, N.Y. 10312

MasterCard

Send for catalog with complete descriptions.

Please add $1.00 per order for postage. N.Y. residents, please add proper tax.

Prospect, Kentucky, October 1986

Vol.2 No.2

Writer: Jeffrey Parker

The RAINBOWfest Reporter

© Falsoft, Inc. All Rights Reserved

CoCo fans find bargains at Chicago RAINBOWfest

Our fourth Chicago RAINBOWfest (our 11th show) was once again at the Hyatt-Regency Woodfield, May 23-25. Our next show is in Princeton, New Jersey, Oct. 17-19, and promises to be a coming-out party for the new CoCo 3.

Braving the heat and sun of Memorial Day weekend, thousands of eager CoCophiles swarmed into the Hyatt-Regency Woodfield, just outside of Chicago, for the eleventh RAINBOWfest.

There were bargains galore. Radio Shack led the way with items like their CGP-115 printers for only $150 and new FD-500 slimline Drive 0 packages for the incredibly low price of $149.

All manner of manufacturers and celebrities were there, with news of new CoCo products and interesting, informative seminars to answer questions. Of course, there was the CoCo Community Breakfast, all the news on the rapidly growing OS-9 Users Group, and above all else, bargains, bargains, bargains.

The tone of this RAINBOWfest was one of exuberant support. Although there were more attendees than at the previous show, the exhibition hall was larger, so many people thought fewer people had attended. Said Lonnie Falk, publisher of THE RAINBOW, "We're going back to a smaller room next year. I thought a bigger room was what everybody wanted, but we got it and now people are complaining more. Next year we'll go back to the original size."

Excitement ran high about the new CoCo. Unfortunately, no detailed information was available. Special CoCo Community Breakfast guest speaker Steve Bjork said that, because he was under non-disclosure agreements with Tandy, he could really only talk about what he would *like* to see in such a new machine. Bjork also spoke about the power of the OS-9 operating system, and about the surfacing industry based around CDI (Compact Disk Interface) ROM technology.

[Editor's Note: Steve will be joining independent programmer Greg Zumwalt and Tandy's Barry Thompson and Mark Siegel, both key figures in the CoCo 3's development, in a special roundtable discussion of the Color Computer 3 at our Princeton RAINBOWfest, October 18.]

RAINBOW publisher speaks of loyalty, bright future

RAINBOW's Lonnie Falk spoke to a full crowd of excited CoCo and RAINBOW fans about the seriousness of the Color Computer, the strength of the machine because of its huge user base, and the tremendous loyalty from third-party manufacturers. Falk, who built Falsoft, Inc. and THE RAINBOW around his initial love for the Color Computer, expressed optimism about a bright future for CoCo owners. "Radio Shack is a smart company. They know they've got a strong product and equally strong support in the CoCo."

Falk said THE RAINBOW would go on serving the CoCo community without fail. "This machine has a bright future," said Falk, "and we will be a part of that future."

Cecil "Jeff" Houk, a music programmer for Speech Systems, appears ready to direct a CoCo symphony.

Speech Systems music, music, music

If you weren't at the Speech Systems booth, you might never believe what our powerful little CoCo can really do. Amid the din of fully synthesized orchestras conducted by the MIDI interface, people trying the piano keyboard for the CoCo, the Stereopack, Musica II and Supervoice, Rich Parry, owner of Speech Systems and developer of the highly acclaimed EARS Speech Recognition interface, ran back and forth as quickly as he could answering questions and helping customers. "I can't believe the turnout," said Parry, quite out of breath. "With the discount prices, we may be sold out of everything by Saturday night!"

Free seminars draw hundreds

The Speech Systems Experimental Traveling Synthesized Band, with Rich Parry, was by far the most popular free seminar of the Chicago RAINBOWfest. Over 300 eager fans tried to cram into the seminar room, but little more than half of that number were able to fit inside.

Author Dale Puckett, former OS-9 Users Group President and well-known OS-9 speaker, gave two well-attended seminars, one an introduction to OS-9 and the other an introduction to BASIC09.

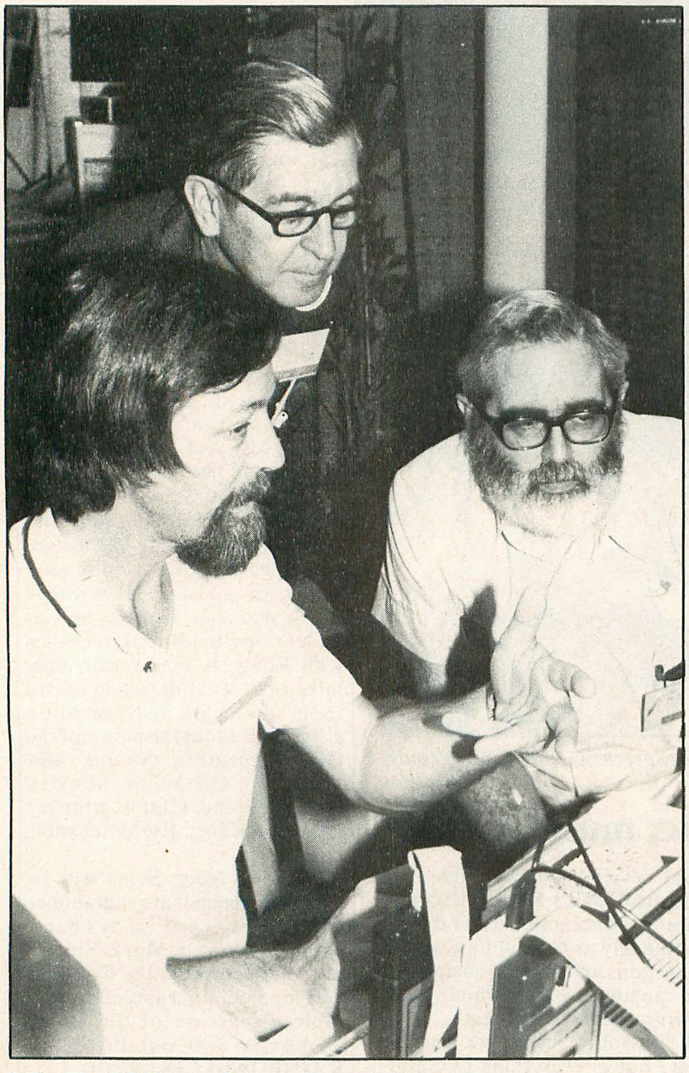
Other seminars included Dick White's Spreadsheet Applications, Tim Jenison of Colorware speaking on the Secrets of *CoCo Max*, and Dan Downard in two seminars for beginners. Jim Reed, THE RAINBOW's managing editor, and Danny Humphress, managing editor of PCM, held a seminar on writing programs and articles for publication in magazines. PCM is another Falsoft publication for Tandy's portable and MS-DOS computers.

There were also seminars on buying a machine to fit your needs, user interfaces and file transfers between the CoCo and MS-DOS machines.

All of the seminars were interesting and well-received, giving those in attendance a chance to meet many of the CoCo community celebrities and to have their questions answered on a more personal basis.

Breakfast speaker Steve Bjork, president of SRB Software (right), tells a fish story to Brian Lantz, president of the OS-9 Users Group.

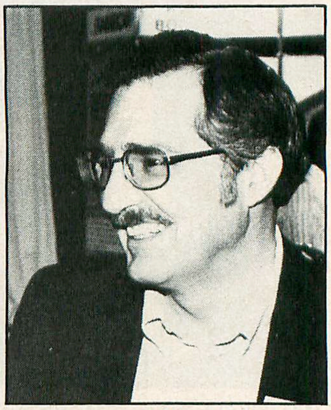
See You at
RAINBOWfest Princeton
October 17-19



Mike Ward (left) goes through the motions of getting a CoCo online.

CompuServe online from RAINBOWfest

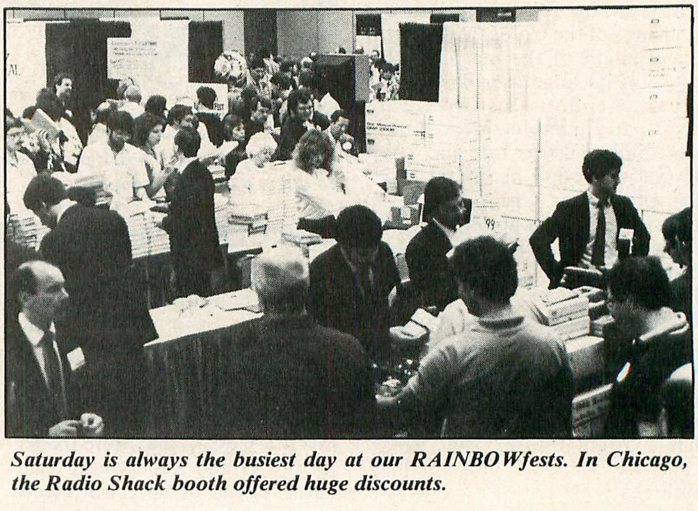
CompuServe's CoCo Special Interest Group manager Wayne Day gave a comprehensive demonstration of the SIG's online database for Tandy users. In addition, free time was being raffled off hourly during the entire show. Mike Ward, author of the *Mikeyterm* communications program for the CoCo, was on hand, too.



THE RAINBOW's Dr. Michael Plog is soon to release his new CoCo statistics book.

Radio Shack wheels and deals

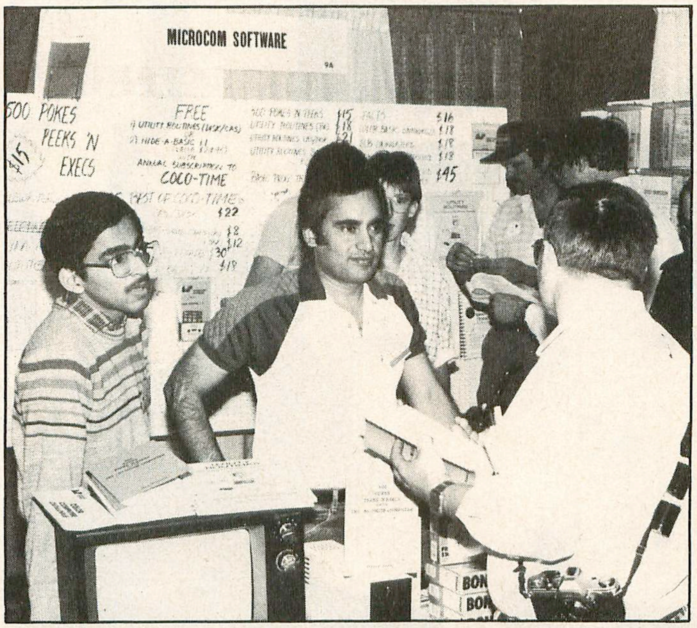
Occupying a large exhibit space at the show, Tandy/Radio Shack dealers were selling everything they had at unbelievably low prices. The 64K Color Computer 2 was being sold for $99 and FD-500 Drive 0s for $149. Model 100 portable computers were going for only $250, with some lucky people buying several at a time for an astounding $150 apiece. CCR-81s went for $29.95 and the list goes on and on. In addition, hundreds of popular software items were sold at more than 60 percent off. The most popular item there, according to a Radio Shack dealer, was the CGP-115 color ink-jet printer. It sold out within minutes of the show's opening on Friday evening at a low $150.



Saturday is always the busiest day at our RAINBOWfests. In Chicago, the Radio Shack booth offered huge discounts.

Disto is in control with super controller

Tony "Turn of the Screw" DiStefano, a RAINBOW contributing editor, was manning the Disto booth with its fascinating and ingenious new four-DOS controller with internal expansion port. Also on display at Disto were the 80-column card with real-time clock and parallel printer port, the MPROM programmer for EPROMS, and the Super RAMDisk 256/512K. They also offered their C-DOS operating system, which substantially upgrades Extended Color BASIC and adds drivers for Disto's display, printer and controller devices.



Microcom's Kishore Santwani (left) and Gary Jes answered questions about their books and utility software.

A bang-up time with DynaCalc

Dennis Derringer, well-known author of the *Pro-Color Series*, was on hand to demonstrate his line of products. Attendees at RAINBOWfest also saw the introduction of two new products from Derringer Software: *Summary*, for summarizing spreadsheets, and *Max Edit*, a program to design and edit *CoCo Max* fonts. "It's a little bit of a dilemma," said Dennis. "I am also selling a three-disk set of fonts for *CoCo Max*, and they are doing very well. They appeal to people who want more text fonts, but don't have time to design them." Dennis was offering a substantial discount on all his products, and business was booming.

Sharing the booth with Derringer Software was Joe Turner from Computer Systems Center, producers of *Dynacalc*. While Joe could not sell the products himself, Radio Shack was offering them at discounted prices. "I can only promote them," said Joe. "I can't sell them. But I can send you right over to Radio Shack and they'll take care of you." Because of the strong interest in OS-9 at this RAINBOWfest, the OS-9 version of *Dynacalc* was doing very well.

Special packages from T&D Software

T&D Subscription Software was on hand with nearly 50 tape and disk packages from its monthly subscription software service. Not only were they offering reduced prices on their monthly program disks, but they had also put together special packages at discounted prices.

RAINBOW's development coordinator Ira Barsky makes notes for future shows.

Free pictures for CoCo MAX II

Tim Jenison of Colorware was selling *CoCo Max II* for a special price of only $69. With each purchase he was including a free disk full of *CoCo Max* images. The new *CoCo Max II* has 14 fonts, dynamic two-dimensional shrink and stretch, supports multiple drives, and is, on the whole, incredible to behold. Upgrades from *CoCo Max I* were available for $20.

Hot new games, graphics, upgrades and more

Many other products were either introduced or displayed at the Chicago RAINBOWfest. All of them are top-quality items, and all were offered at special show rates.

From Diecom products of Canada came several new products: *Gantelet*, *F-16 Assault* and *Karate*. Along with several other titles, these products have outstanding graphics and action. And imagine, the author is only 19 years old!

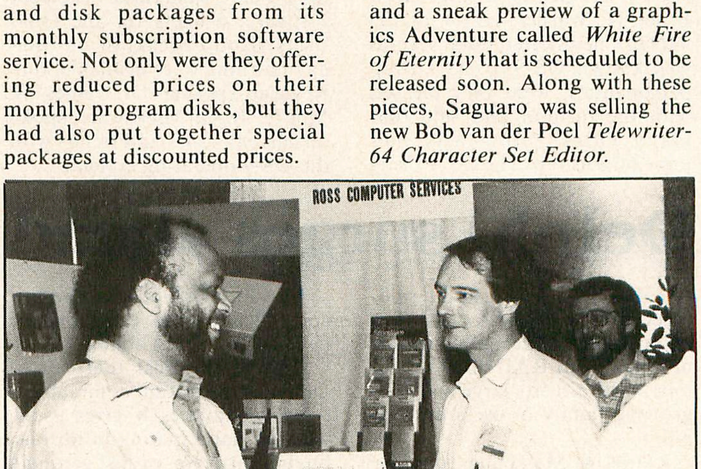
Four Star Software offered *PenPal 2.0*, with some nice new features, at a special show price, along with several games and new OS-9 utilities packages.

Michtron came out in full force with a range of products and the introduction of a new game, *BYO Pinball*, which rivals the MS-DOS version of the program in detail and action. Along with this piece of new software were other hits from Michtron, such as *Speed Racer, Rommel 3-D* and more.

Howard Medical impressed the RAINBOWfest crowd with their 80-column, dot-addressable graphics printer, the Howard 80.

Saguaro Software introduces new Adventures

Saguaro Software was on hand with special prices and several new products, including the *Andrea CoCo* graphics Adventure, a new Adventure from Scott Cabit called *Adventure in Mythology*, and a sneak preview of a graphics Adventure called *White Fire of Eternity* that is scheduled to be released soon. Along with these pieces, Saguaro was selling the new Bob van der Poel *Telewriter-64 Character Set Editor.*

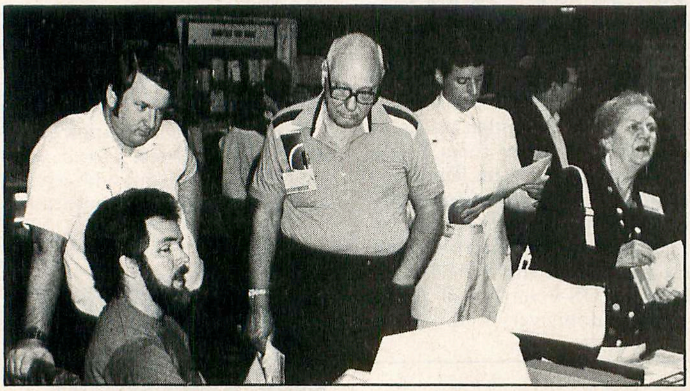


RAINBOW reviewer A. Buddy Hogan (left) makes a purchase from John Ross.

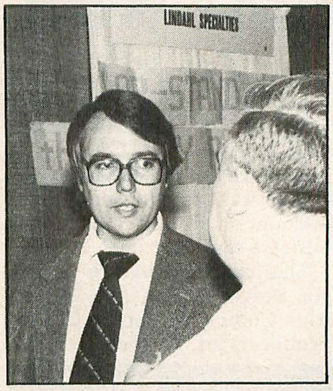
First-time exhibitor Synercon displays powerful options

Synercon, Inc., a new exhibitor at RAINBOWfest, was offering a 256K external plug-in memory expansion board, as well as a 1-megabyte board that the OS-9 people were thrilled to see. They were also offering a five-meg hard drive, a 20-meg drive, and their new operating system, SDOS, along with the *SD BASIC Compiler*, a true BASIC compiler. Bundled with the compiler was a two-pass assembler, 6809 debugger and text editor.

Synercon's Richard Gros goes over a printout with pharmacist David J. Bialka and Mrs. Bialka.



Dennis Derringer of Derringer Software (seated) demonstrates his popular **3Pro-Color-File.**



Ross Litton of Howard Medical fields a question.

Great discounts from Prickly-Pear

Prickly-Pear Software, sharing the booth with Saguaro, featured several excellent utilities, as well as the highly acclaimed *To Preserve Quandic* and its new *Hall of the King*, a two-disk graphics Adventure.

If you're tall enough to reach the arrow keys, it's game time!

OS-9 Users Group a star attraction

Brian Lantz, president of the OS-9 Users Group, together with Bruce N. Warner, editor of the *MOTD* newsletter, and several well-known OS-9 Users Group personalities, were very pleased with the turnout and said that many OS-9 enthusiasts had joined the group. The OS-9 Users Group offered membership, buttons, T-shirts and raffle tickets for software. Tickets for the OS-9 Users Group Breakfast on Sunday morning were available, too. Keynote speaker Dr. James W. Moore, Jr., of Microware, spoke on current issues and trends with the OS-9 operating system.

Delphi surges ahead

John Gibney, national sales director for Delphi, was very enthusiastic about signing people up right from RAINBOWfest to join in the already large and fast-growing family of users on Delphi.

RAINBOW Magazine runs the CoCo SIG on Delphi, providing the community with instant communication, online shopping services and a host of other valuable features. "When people become aware of the capabilities of a service like Delphi, and the low cost, it's like discovering a whole new world," said Gibney.

One of the best features of Delphi is the instant communications capabilities it gives users, whether participating in forums, buying software, or just getting a question answered by an author or editor from RAINBOW. The CoCo SIG is just one aspect of Delphi, and John encourages users to discover Delphi's full potential.

Sofco's hardware priced right

Sofco Computer Supply Company, of Downer's Grove, Illinois, had quite a few show specials to offer, including DEC dual drives at special RAINBOWfest prices. Among their other offerings were labels, cases, binders, drive-cleaning kits, hardware tool kits, and Samsung color and monochrome monitors. According to Charles W. Schneider, who ran the booth at the show, sales were brisk and he was dropping prices on equipment about once an hour to give show goers the best bargains possible.

David Dies of Diecom Products was one of the Canadian exhibitors.

J&M's Albuquerque express

J & M Systems, Ltd., of New Mexico, are always regulars at every RAINBOWfest. At the Chicago show, they had great deals on many of their products, including their original JFD disk controller, "slightly defective" drive controllers, their famous *Memory Minder* drive alignment and testing program, and hard drives.

Alpha Products comes to CoCo

New to the Color Computer market is Alpha Products of Woodhaven, New York. Alpha Products has long been a manufacturer of peripheral products for the other Radio Shack TRS-80 computers. Alpha's main product is the Amazing A-Bus, an expansion chassis and motherboard assembly which allows the interfacing of many different cards, or even additional motherboards, to the Color Computer. Some of the devices supported and supplied by Alpha are the digital and analog input cards, a motor controller, clock with alarm and voice synthesizer.

Zytek's Jim O'Keef (right) appears dressed for Adventure as he discusses* Plateau of the Past *with two RAINBOWfesters.

Zytek shows unique map window programming

Zytek, of Blue Island, Illinois, was on hand displaying their new Adventure, *Plateau of the Past*. It uses the unique map window programming and is a thrilling new entry into the Adventure market for the CoCo. Driven by a special price and a special three-free-disk incentive to the first 50 customers, this program, too, was among those that sold out before the end of the show.

Tom Mix Software brings on the games

Tom Mix Software was on hand with some real greats, like its *P51-D Mustang Attack* flight Simulation, *Approach Controller* Simulation, and several new releases, such as *Martian Crypt* and the *Misadventures of Eddie*. Especially popular was the new joystick-controlled, animated graphics Adventure, *Maui Vice*, which sold out by the end of the show.

TOM MIX S
ng of Color Con
T-Shirts

Tom and Gisele Mix find a moment's respite from duty in the exhibit hall.

Derringer Software.

Max Fonts

New for CoCo Max

Now you can have up to 72 fonts for creating dazzling type-set titles and special displays!

3 SETS OF 24 FONTS
WHICH ARE OUT OF THIS WORLD!

$\$24^{95}$ *each* $3/\$64^{95}$

Written by Wally Bayer and Mike Shawaluk

Max Edit

© 1985 Snard Enterprises

A FONT EDITOR FOR COCO MAX

- *Edit current fonts*
- *Create new fonts*
- *Design symbol fonts*
- *Comes with pre-defined fonts*
- *CoCo Max I & II compatible*

$\$19^{95}$

(Disk Only)

Written by: Michael W. Shawaluk
CoCo Max® is a registered trademark of Colorware.

CoCo's Best & Fastest Spreadsheet

RS-DOS VERSION

FOR 64K DISK SYSTEMS

DYNACALC®

- 51 x 24 Display with Lower Case
- Super-fast Smart Screen Refresh
- Auto-Repeat Keyboard Driver
- Fast 16-Digit Arithmetic with Scientific Functions
- Two-way communications with PRO-COLOR-FILE ★Enhanced★

Serving the Color Computer for 4 Years.

PRO-COLOR-FILE

©1984 by Derringer Software, Inc.

ENHANCED 2.0

- 60 Data Fields for each record
- 1020 spaces available per record if needed
- Maximizes multiple drive operation
- 28 equation lines (+ − * /)
- IF-THEN-ELSE logic test in equations
- Full Screen editing on up to 4 data entry screens
- Key click and auto key repeat
- Stores custom designed report formats
- Obtain totals, averages, or summaries for any field
- Output reports to printer, screen, or disk file
- Send data out to a DYNACALC compatible file
- Separate label generator for up to 10 across labels
- Pre-define up to 16 indexes for searching/reporting file
- Sorts 750 records in under 5 minutes
- User defined selection menus
- Repeated tasks performed with one keystroke
- Comes with 75 pages of documentation in a 3 ring binder
- Supported by a national users group
- Full time programmer support
- Supplied on an unprotected disk

$59.95

PRO-COLOR-FORMS 2.0

©1984 by Derringer Software, Inc.

PRO-COLOR-FORMS will access data files created with PRO-COLOR-FILE and merge them with a letter or place them on pre-printed forms.

• STORE UP TO 6 FORMATS • USER DEFINED PAGE SIZE • SUPPORTS SPECIAL PRINTER CONTROL CODES • RIGHT JUSTIFICATION • PASSWORD PROTECTION • MERGES WITH GRAPHICS FROM MASTER DESIGN OR TELEGRAPHICS •

PRO-COLOR-DIR

©1984 by Derringer Software, Inc.

PRO-COLOR-DIR will read your directories and create a master data file that can be accessed by PRO-COLOR-FILE for sorting and reporting. 1000 + records can be stored on one diskette with valuable information about each program.

You can obtain hard copies of the information and create labels of the filenames for placing on the diskette itself.

• DISK ID NAME • FILENAME/EXT • TYPE OF FILE • DATE CREATED • DATE UPDATED • NUMBER OF GRANS ALLOCATED • NUMBER OF SECTORS ALLOCATED AND USED • MACHINE LANGUAGE ADDRESSES •

$29.95

FOR BOTH

DYNACALC®

SPREAD SHEET FLEXIBILITY

(Includes Dynagraph, Sidewise)

$79.95

Telewriter-64™

WORD PROCESSOR POWER

$59.95

CoCo Max II

GRAPHICS SUPERIOR

$79.95

@ SUMMARY

©1985 Derringer Software, Inc.

If you use your spreadsheet program to keep track of your expenses then @SUMMARY can help you analyze those expenses. For example, if you indicate a "Category" for each expense then @SUMMARY will produce a report that shows a total for each category, the highest amount, the lowest amount and the average amount. In addition, @SUMMARY can produce a hi-res line graph or bar graph of the analysis and allow you to place titles on the graph. A hardcopy of the graph can also be generated as well as saved to disk.

The analysis can be saved in a "data file" which can be loaded into DYNACALC or read in by @SUMMARY for future additions to the analysis. If you use other Spreadsheets such as ELITE*CALC then you have added a graphing feature to your spreadsheet applications. The analysis can also be saved in an ASCII file which can be read by word processors for inclusion in a report.

@SUMMARY is compatible with any spreadsheet program that can generate an ASCII text file of worksheets.

*Specify RS-DOS or OS9**

(disk only) **$19.95**

**OS9 version does not have Hi-Res graphing and requires Basic09.*

DYNACALC® is a registered trademark of Computer Systems Center
*ELITE*CALC is a trademark of Elite Software*
OS9 is a registered trademark of MICROWARE and MOTOROLA.

SIDEWISE

©1984 by Derringer Software, Inc.

Add a new "twist" to your printer's capabilities!

SIDEWISE makes your printer do something you never thought possible—print side ways!

SIDEWISE will read in any ASCII text file and print it out side ways using a Radio Shack, Epson, Okidata, C-Itoh or Gemini printers having dot-graphics ability.

SIDEWISE OS9 is compatible with DYNACALC OS9 and requires Basic09

SIDEWISE OS9 (Disk only) **$39.95**

SIDEWISE RS-DOS **$24.95***

* RS-DOS version included FREE with DYNACALC®

OS9 is a registered trademark of MICROWARE and MOTOROLA.

TELEGRAPHICS

©1984 by Derringer Software, Inc.

PRINT HI-RES GRAPHICS USING TELEWRITER-64!

Use CoCo Max, Graphicom or other graphics programs to create letter heads and print them while using Telewriter-64.

Telegraphics interfaces with Radio Shack, Epson, Gemini, C-Itoh and Okidata printers having dot-addressable graphics. A simple modification to Telewriter-64 will allow you to exit Telewriter via the DISK I/O MENU and print out the graphic without affecting any of your text in the buffer.

This is the same feature that is included in our MASTER DESIGN program. Since we felt you don't need to buy two graphics editing programs, we have made this feature available at a reduced price.

$24.95

(Available Only On Disk)

NO OTHER DISCOUNTS APPLICABLE

MASTER DESIGN

©1984 by Derringer Software, Inc.

Generates lettering in hi-res graphics that can be different sizes, skinny, bold, textured, drop shadowed, raise shadowed or tall. Also interfaces with the Telewriter-64 word processor for printing hi-res displays with your letters.

Take full advantage of all the extended BASIC hi-res graphic commands including boxes, circles, lines, copy displays and utilize GET and PUT features. Added commands include mirror reflection, turn displays backwards or upside down. Squish displays, create dot patterns for shading or diagonal lines.

The Letterhead Utility allows you to access hi-res graphics from Telewriter-64, your own BASIC programs or PRO-COLOR-FORMS.

Interfaces with dot matrix printers having dot addressable graphics.

$29.95

See reviews in: July '84 Rainbow, Oct. '84 Hot CoCo

Derringer Software, Inc.
PO Box 5300, Florence, SC 29502-5300
To place an order by phone, call: ***(803) 665-5676***
10 AM and 5 PM EDT
Check, Money Order, VISA or MasterCard

South Carolina residents add sales tax.
Include $3.00 for UPS Shipping - $5.00 U.S. Mail - $9.00 Air Mail
Canadian Distributor-Kelly Software
Australian Distributor-Computer Hut Software

Inside the CoCo 3

By Marty Goodman
Rainbow Contributing Editor

This is a collection of observations made after examining the insides of a Color Computer 3 and comparing its ROM to that of a CoCo 2.

ROM Addressing

The CoCo 3 has a 32K by 8-bit ROM. The lower 16K of this ROM contain code that is *nearly* the same as that in the 16K of Color BASIC and Extended Color BASIC, with the following changes:

The copyright message in the Extended BASIC part of the ROM is altered, as is the version number in the Color BASIC ROM.

The part of Extended BASIC that formerly contained code for the `DLOAD` command is now completely different.

The startup sequence in Color BASIC, including the RAM chip selector and memory size checker, as well as the warm/cold start reset sequence code, is all rewritten.

The keyboard routine in Color BASIC has been rewritten (possibly to allow use of the keyboard interrupt, which would considerably speed the execution of Color BASIC).

The vectors set at the end of the Color BASIC ROM are now all pointing in different places.

Apart from these relatively minor changes, there exists a complete image of the Color BASIC and Extended BASIC ROMs in the lower part of the 32K by 8-bit ROM.

The GIME chip supports three modes for addressing ROM in the CoCo 3. In one of these modes, only the lower 16K of ROM is addressed internally, and the remaining 16K of addressable ROM is looked for on the cartridge port. In this mode, the ROM in the CoCo 3 should be able to be made to closely emulate the appearance of the ROMs in a CoCo 2. In fact, even programs that use undocumented calls to the ROM should not be compromised on the CoCo. The two low-order bits of $FF90 control the mapping of the available CoCo 3 ROM memory. Note that the CoCo 3 can, via those bits, be made to address a full 32K of ROM on a ROM pack, allowing it to support up to 64K total of ROM in the system.

RAM Upgrades

The CoCo 3 is delivered as a 128K machine, with expansion to 512K of memory via a plug-in board. The 128K unit has four 18-pin, 4-bit wide by 64K 4464-type DRAM chips. The 512K add-on board is inserted after *removing* the four 4464 chips, and that board has on it sixteen 1-bit by 256K 41256 DRAMs. Presently the add-on board is the only option for expanding the addressable memory of the CoCo 3.

The board is easy to duplicate, and it is likely that third-party suppliers will soon be carrying versions of it, probably priced somewhat below Tandy's $150 price. In theory, a sensible way to upgrade the CoCo 3 would be to replace the four 4464 DRAMs with four 4-bit wide by 256K 1-megabit DRAMs. But that sort of chip is barely on the drawing board, and its production and sale at less than astronomical prices is not likely to occur soon.

Such a 4-bit wide by 256K chip is quite different from the 1-bit wide by 1-megabit chips that are already being sold in the $50 per chip price range. The 1-bit wide by 1-megabit chips should soon be an economic reality. But a 4-bit wide by 1-megabit chip will, as I stated, be a long time coming.

The RAM is arranged so a 16-bit wide data bus is available to the video circuitry. This allows data to be put on the screen much faster than on the old CoCo 2, providing for higher resolution and more colors in the CoCo 3 display.

RAM Addressing

The GIME chip supports a complex and powerful memory manager far more sophisticated than the crude bank switching arrangements used in CoCo 2 RAM upgrades such as Thunder RAM and the J&R Banker. The memory manager allows you to take any group of eight 8K segments in the full 512K address space and map them into the 64K of available memory directly addressable by the 6809. The old CoCo 2

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW's CoCo SIG on Delphi. His noncomputer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

memory upgrades could move memory around only in clumsy 32 or 64K blocks and were far more limited in how they could shuffle such blocks. The control addresses for the memory manager are in the $FFA0 to $FFAF address range.

This sophisticated memory management is what allows the CoCo 3 to run OS-9 Level II. Writers of dedicated applications for the CoCo 3 also find this powerful memory manager allows them to easily and quickly address the half-megabyte of the CoCo 3 without disrupting programs running in part of the 6809's address space. The CoCo 3 could become an attractive machine for scientific and industrial tasks because of its low price and high performance.

When it boots up, the CoCo 3 reserves memory at $FE00 through $FEFF for special system functions, including interrupt handling. The GIME hardware is set up to hold the top 256 bytes of addressable RAM (located just below the control I/O ports of $FF00 through $FFFF) constant through all memory manager address changes. This hardware feature is necessary to implement OS-9 Level II.

But the need to keep memory in this area constant will be *the* single most common cause of incompatibilities between CoCo 2 Disk BASIC software and the CoCo 3. It may be possible, using a switch at Bit 3 of $FF90, to turn off that reservation of those top 256 bytes and, via other manipulations, to more closely emulate the old CoCo 2 environment. Alternatively, it may prove easier for many software makers to do the minor rewrite needed to leave that address area alone. In many cases, this may be all the change needed to make "incompatible" CoCo 2 software run on the CoCo 3.

Emulation of Old SAM Functions

VDG related functions — Addresses $FFC0 through $FFD3 function on the GIME in exactly the same way they did on the old SAM, providing for total emulation of all documented old SAM/VDG functions.

Memory related functions — Addresses $FFD4 and $FFD5 (the page switcher) are supported on the GIME chip. The RAM/ROM switcher at $FFDE and $FFDF that switches 32K of ROM with 32K of RAM is supported too. Thus, many Disk BASIC programs that run in a "96K" environment on the CoCo 2 will still work on the CoCo 3.

Both *Graphicom* and *WEFAX* appear to work properly on the CoCo 3. These are examples of Disk BASIC 96K programs that use only documented calls to ROM vectors and do not mess with the top 256 bytes of available RAM.

> ***"The GIME chip supports three modes for addressing ROM in the CoCo 3."***

Not surprisingly, $FFDA through $FFDD ports on the old SAM set up for 4K, 16K or 64K of memory using the old CoCo and CoCo 2 chip arrangement, are *not* supported on the GIME chip. No great loss here, except to insiders who used the SHIFT/BREAK/Reset technique to make RAM snapshots.

Clock control — The CoCo 3 uses a primary crystal that works at *twice* the speed of that used in the CoCo 2. This is an 8X colorburst crystal: 28.63636 MHz. The old speed up POKE at $FFD6 and $FFD7 that would make the CPU address the ROM at twice normal speed (but still address RAM at its normal speed) is *not* supported on the CoCo 3.

But before you get alarmed, rest assured that when Tandy took that away, they gave us something *much* better: The port at $FFD8 and $FFD9 on the old CoCo caused the ROM and RAM to be addressed at double speed, but terminated RAM refresh and completely destroyed the old CoCo and CoCo 2's video display. However, on the CoCo 3, this "super high speed" POKE is now *fully* supported, the RAM memory *is* refreshed and the video display is unaffected. This means you can properly run your Disk BASIC programs at full double speed on the CoCo 3, though you may have to drop back to normal speed during such functions as cassette and disk I/O and sound generation.

Video Display of Text

I have experimented with displaying the CoCo 3's video on quality amber monochrome monitors. Initially, at power up, the display had the ugly vertical stripe distortion that is typical when you put a color signal on a monochrome monitor.

Although the GIME supports turning off the color signal via a port (Bit 4 of $FF98), poking under BASIC to this port was of limited value because the port is reset each time a new BASIC print statement is executed. Later on, we may find an easy way to properly shut off the color when in BASIC.

But, for now, by properly altering the foreground and background colors using the sophisticated palette control of the CoCo 3, we can make the CoCo 3 produce a credible image on a monochrome monitor. Even in the 80-column display mode, the image is quite readable. Somewhat to my disappointment, although the 80-column set was not all that bad, I found its sharpness and crispness somewhat inferior to that of my PBJ Word Pak I 80-column card, and far inferior to that of my IBM PC clone. But part of this may have been due to a badly adjusted monitor, and part to my not having sufficient time to play with the color set. Both black letters on light background *and* light letters on black background can easily be produced. Underlining is supported. The character font is the same as that of the TI VDG chip.

Buying a composite video monochrome monitor (in the $60 to $120 price range) allows you to take advantage of the 80-column display of the CoCo 3. A color composite monitor *will not* support the 80-column display. If you want both 80-column display of text *and* full color capability, your only option is an RGB analog monitor. Tandy wants $300 for its CM-8. This is something of a bargain, actually, since Magnavox and Sony, who also make CoCo 3-compatible RGB analog monitors, want at least $70 more, though their products are more flexible and support other signal protocols as well).

Via the GIME video hardware, one can generate 32-, 40-, 64- and 80-column text screens, although, on a color TV, only the 32-column works well at all. The 40-column display will often be cut off by the overscan found on most commercial color TVs.

Add-on Hardware Addressing

The GIME uses lots of address space not used before by the SAM chip. It does leave open address ports between

$FF60 through $FF7F for use by Radio Shack and third-party developers.

Of these, $FF7F is used by the Multipak, $FF68 through $FF6F are typically used by the RS-232 Pak card and the Tandy Modem card (or PBJ 2SP card). $FF7D and $FF7E are used by the Tandy Speech Sound pak if they are in the system. Other devices addressed in this legal range are Ears, third-party voice packs and the Stereo Pak from Speech Sound. All of these should work just fine on the CoCo 3.

But woe to the manufacturer who did not heed the warnings given by Tandy to not use addresses outside of that range! Sadly, *CoCo Max* is one such; it will not work on the CoCo 3 in its present form. Hopefully, new *CoCo Max* hardware will be made that fixes this problem.

Among those pieces of hardware that will mess up the GIME chip and are therefore somewhat incompatible with the CoCo 3 is Radio Shack's Multipak Interface. Yes, there is a bug in the PAL chip in both the old and new Multipak interface that lets the port at $FF7F ghost to $FF9F. This conflicts with a "Horizontal Offset Register" in the CoCo 3's GIME. I have been told by an informed source that the problem only occurs in 512K CoCo 3s, and that a fix in the form of a new PAL chip will be provided by Tandy.

It has been rumored that this fix for the Multipak will cost $6, regardless of whether you have an old or new Multipak. This is a reasonable price for such a fix. This fix is not yet available at your service centers or at National Parts, but should be ready by the time 512K CoCo 3s reach your stores.

Compatibility

In some preliminary testing, I found that *Telepatched Telewriter* and *Mikeyterm*, two popular applications, both crash when booted on the CoCo 3. At present I am not sure of the exact reason or how to fix these. But fixes for both should be forthcoming. It certainly is true that many popular CoCo 3 Disk BASIC standbys will not work on the CoCo 3. But it is equally clear that Tandy bent over backward to try to preserve compatibility for both their own *and* for third-party software. Unfortunately, in many cases, their best efforts were not good enough. But the CoCo 3 is so nearly CoCo 2 compatible that it should not be very hard to fix existing CoCo 2 favorites to run on the CoCo 3. My one major criticism of Tandy in this regard is that they should have warned us long ago to stay out of the $FE00 through $FEFF region much as they did clearly warn us not to use undocumented vectors.

Conclusion

Hopefully there will soon be new software taking advantage of the CoCo 3's vastly improved video display, RS-232 and memory capability, which will make the issue of CoCo 2 incompatibility under Disk BASIC less of a concern.

Special Note of Thanks:

I would like to give special thanks to Tandy Corporation for giving permission to developers who had CoCo 3s to allow me to examine them and their documentation after the CoCo 3 was officially released. Without the kind cooperation of Tandy Corp, Steve Bjork and Dale Lear, it would be impossible for me to get this information out to the CoCo Community as early as this.

CORRECTIONS

"A Recipe to Fix CoCo Fried Chips" (August 1986, Page 24): Marty Goodman has written to clarify and update some statements he made in that article. Marty had implied that J&M Systems might be reluctant to provide schematics for its disk controllers. This was based on Marty's past experience. However, more recently Marty has been informed by Richard Allen of J&M Systems that schematics for both of their disk controllers are available for $5 each from J&M. Marty extends his apologies for implying otherwise.

"Which Nym is Witch?" (August 1986, Page 40): Brien Dick tells us we need to insert the following line into his *Nymatch* program:

```
1475 DATA BUY,5,BYE,5
```

"The Old Switcheroo" (August 1986, Page 108): In Figure 4 on Page 112, there is an extra reference to Pin 5. Please disregard the reference to Pin 5 that appears to the left of J1, J2 and J3 in the middle of the figure.

"What's Inside a Mouse?" (August 1986, Page 180): Due to a paste-up error, the lines in Listing 2 are not in order. Lines 10100-15000 from the second column on Page 184 should be placed just after Line 10000 in the first column. We apologize for any inconvenience this has caused.

"Wishing Well: Achieving Arcade Game Speed in BASIC" (July 1986, Page 98): Joel DeYoung has found if you make a high score it is not recognized until another game has been played. His solution is to change the following lines:

```
56 IF NS>TS THEN TS=NS
57 PRINT@71,"HIGH SCORE";TS:PRIN
T@135,"YOUR SCORE";NS
```

This should solve the problem. It is the same as switching lines 56 and 57 around.

"Outfox Those Narrow Printers With Rotate" (May 1986, Page 120): The filename in Line 250 of Listing 3 on Page 126 should be changed from *RSDWS* to *RSIDWS*.

"Who Will Survive the Castle of Doom?" (June 1986, Page 26): Scott Halfman writes to tell of some corrections that need to be made to his *Castle* program. The dimension statement in Line 10 needs to be changed to `DIMG(6,2)`. Also, insert the following at the beginning of Line 15:

```
SC$="0":
```

For quicker service, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` at the CoCo SIG prompt and `INFO` at the Topic? prompt.

MORETON BAY SOFTWARE

MORE GOOD SOFTWARE

RAPHICOM
3 disk package $29.95
64K EXB disk

AM DIAMOND
graphic adventure $29.95
32K EXB disk

OT SLOT
casino simulation $24.95
32K EXB disk or tape

CLIPSE
excellent pixel editor . . $19.95
64K EXB disk

GOOD SOFTWARE

THE MOTION PICTURE
Animation tool $39.95
64K Disk Only

FANTASY CLIP ART
Cocomax or Graphicom $14.95
64 K Disk

BJORK BLOCKS
Graphics with Animation $34.95
32K EXB Tape

FILE CABINET
Data Base for tape $29.95
16K EXB Tape

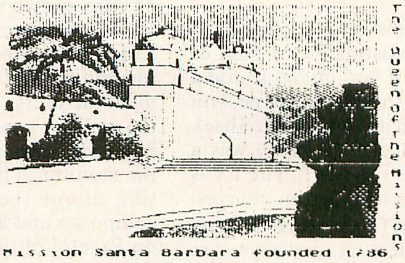
COCO WRITER TWO
Tape Version $34.95
16K EXB Tape
Disk Version $44.95
32K Disk

Business Software Call Us

```
   A SUPER COLOR PRINTER
 The   OKIMATE   20
   AT A SUPER LITTLE PRICE!
```

```
rints ten characters to the inch,
elve characters fifteen characters to the inch.
lics. Italics. Italics.
nderline Superscript Subscript
```

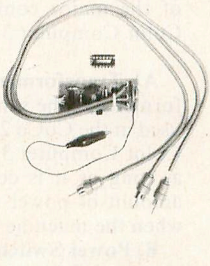
```
  Small. Light weight. Quiet.
rints up to 80 characters per second.
rints four color graphics. Includes
isk software for black and white, two
olor and four color screen dumps of
olor Computer hi res graphics.
  Okimate 20, Plug 'n' Print,
aper, black and color ribbon,
nstructions, software and cable for:
arallel $220.00
10.00 Shipping
```



he only color Okimate
0 Screen Dump Now
vailable for the CoCo.

DOUBLE DRIVER I

The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.

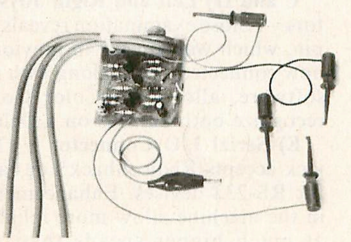


MONO II

Mono II for Color Computer 2. An excellent monochrome monitor driver that has audio output also. Specify model needed.

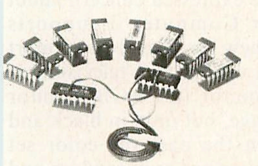
$24.95.

DOUBLE DRIVER II



Finally a monitor driver for the Color Computer II that lets you use a monochrome and a color monitor simultaneously. We're proud of this new driver. The six transister circuit provides optimal signal mixing and signal gain. Excellent monochrome output and better quality resolution in the color ouput than any driver we have seen. Audio output also. Fits all models of the Color Computer II. $29.95.

64K UPGRADES



E Board (solderless - pictured)	$39.95
F Board	$26.95
CoCo 2 (except 26-3134A&B and 26-3136A&B)	$26.95
CoCo 2 (models 26-3134A&B and 26-3136A&B	$39.95

uaranteed Pretested

Having trouble with your CoCo? We have the chips you need. Call us. (805) 962-3127

THE COCO-SWITCHER

A QUALITY PIECE OF HARDWARE

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

$39.95 plus $2.00 shipping and handling

SELECTED REPLACEMENT CHIPS FOR THE COCO

The "COCO CORRECTION" Chips for U11 and U29 Presoldered assembly for E boards upgrades.	$12.95
SN74LS785N (The SAM chip)	$28.95
5809E (Microprocessor)	$19.95
5822P (PIA)	$13.95
5821P (PIA)	$ 8.95
1372 (Color Mixing Chip)	$10.95
Extended basic (EXCEPT models 26-3127B, 26-3134A/B and 26-3136A/B	$29.29

MORETON BAY SOFTWARE

A Division of Moreton Bay laboratory
316 CASTILLO STREET
SANTA BARBARA
CALIFORNIA 93101
(805) 962-3127

VISA

MasterCard

Ordering information

Send $2.00 shipping and handling per order. We ship within 1 working day on receipt of order. Blue Label Service available. California residents add 6% sales tax.

A look at the internal hardware

Dissecting the CoCo 3

By Cray Augsburg
Rainbow Technical Assistant

The following is a list and brief description of the major components and areas on the Color Computer 3 circuit board.

A) Transformer Assembly — This transformer has the same specifications as the one used in the CoCo 2. As in previous designs, the Color Computer 3 draws power from the wall as long as it is connected to an outlet. The amount of power it draws, however, is small when the machine is not turned on.

B) Power Switch — When turned on, allows current to flow to the Color Computer 3's logic circuitry.

C and D) Left and Right Joystick Connectors — Close examination reveals that the sixth pin, which was unused in previous designs, is now connected. This, along with the enhanced software, allows the Color Computer 3 to recognize both buttons on a Deluxe Joystick.

E) Serial I/O Connector — This four-pin jack accepts Radio Shack's de facto standard for RS-232 devices. Enhancements elsewhere in the machine allow more reliable operation at much higher speeds than on previous CoCos.

F) Cassette Port — This five-pin connector allows you to hook a cassette recorder to the Color Computer 3.

G) RF Modulator — This unit changes the video signal so the Color Computer 3 can drive a television display. This circuit was present on all older CoCos and most CoCo 2s.

H) RF Channel Select — For selecting whether the TV display receives the Color Computer's output on VHF channel 3 or 4.

I) Composite Video Output — This RCA phono jack supplies a composite signal for driving a composite color monitor. The Color Computer 3 is not set up to drive a monochrome monitor when you take it out of the box.

J) Audio Output — This RCA phono jack supplies a line-level audio output. It may be connected to the monitor's audio-in jack or to an external amplifier. It will operate even if you are using a TV or an RGB monitor for the display device.

K) Reset — As always, this switch does not destroy memory contents, but causes the computer to stop execution of a currently running program. However, if you have used POKEs or machine-language routines to alter the BASIC routines, they will be changed back to normal by the use of the Reset button.

L) RAM Area — The Color Computer 3 (128K version) contains four 41464 RAM chips. These chips are 64K by 4-bit, dynamic RAM chips. These chips are removed when the machine is upgraded to its limit of 512K RAM.

M) Microprocessor — The Color Computer 3 uses the Motorola 68B09E microprocessor. This 40-pin MPU is designed for reliable operation up to 2 MHz and, as with previous CoCos, gets its clock signal from an external source.

N) ROM Port — This 40-pin cartridge/expansion port accepts existing ROM Paks or the MultiPak Interface. If you intend to use a MultiPak Interface with the new machine, you need to get the MPI fixed at your Radio Shack Service Center first. Apparently, there was a bug in the PAL chip on the MPI. The fix is expected to cost $6 plus installation charges.

O) Memory Expansion Connectors — These three 12-pin header connectors are designed to receive the 512K RAM upgrade board. The 512K upgrade consists of a satellite board containing 16 256K by 1-bit dynamic RAM chips.

P) Keyboard Connector — The Color Computer 3 uses the same clear Mylar cable for its keyboard connection as the 'F' board and later CoCos used.

Q) Power Supply Circuitry — This is where the incoming power, after being stepped down by the transformer, is rectified, regulated and filtered. This section supplies +/-5 volts regulated, and an unregulated 12 volts.

R) 68B21 PIA — Used to drive portions of the video as well as the cassette and sound circuitry of the Color Computer 3.

S) 68B22 PIA — This open-collector device drives the Color Computer 3's keyboard.

T) Clock Crystal — Unlike its predecessors, which used a clock crystal of frequency 14.31818 MHz, the Color Computer 3 uses a crystal with a frequency of 28.63636 MHz. This, combined with the new circuitry in the machine, allows much faster operation.

U) The GIME — This flat-pack is a revolutionary design from Tandy. The GIME (for Graphics, Interrupt, Memory Enhancement) combines the functions of the 6847 (VDG) and the 6883 (SAM) from previous CoCos. In addition to supplying bipolar RAM for faster video action, the GIME manages the extended memory of the Color Computer 3 despite the fact that the 68B09E can directly address only 64K of memory. The GIME can be looked at as the "hardware handler" of the Color Computer 3 as the 68B09E is looked at as the "software handler." It is the coolest-running chip in the Color Computer 3.

V) ROM — This 32K by 8-bit ROM contains Microsoft Extended BASIC and the overlay enhancements produced by Microware for Tandy. All Color Computer 3s come with this Enhanced Extended BASIC.

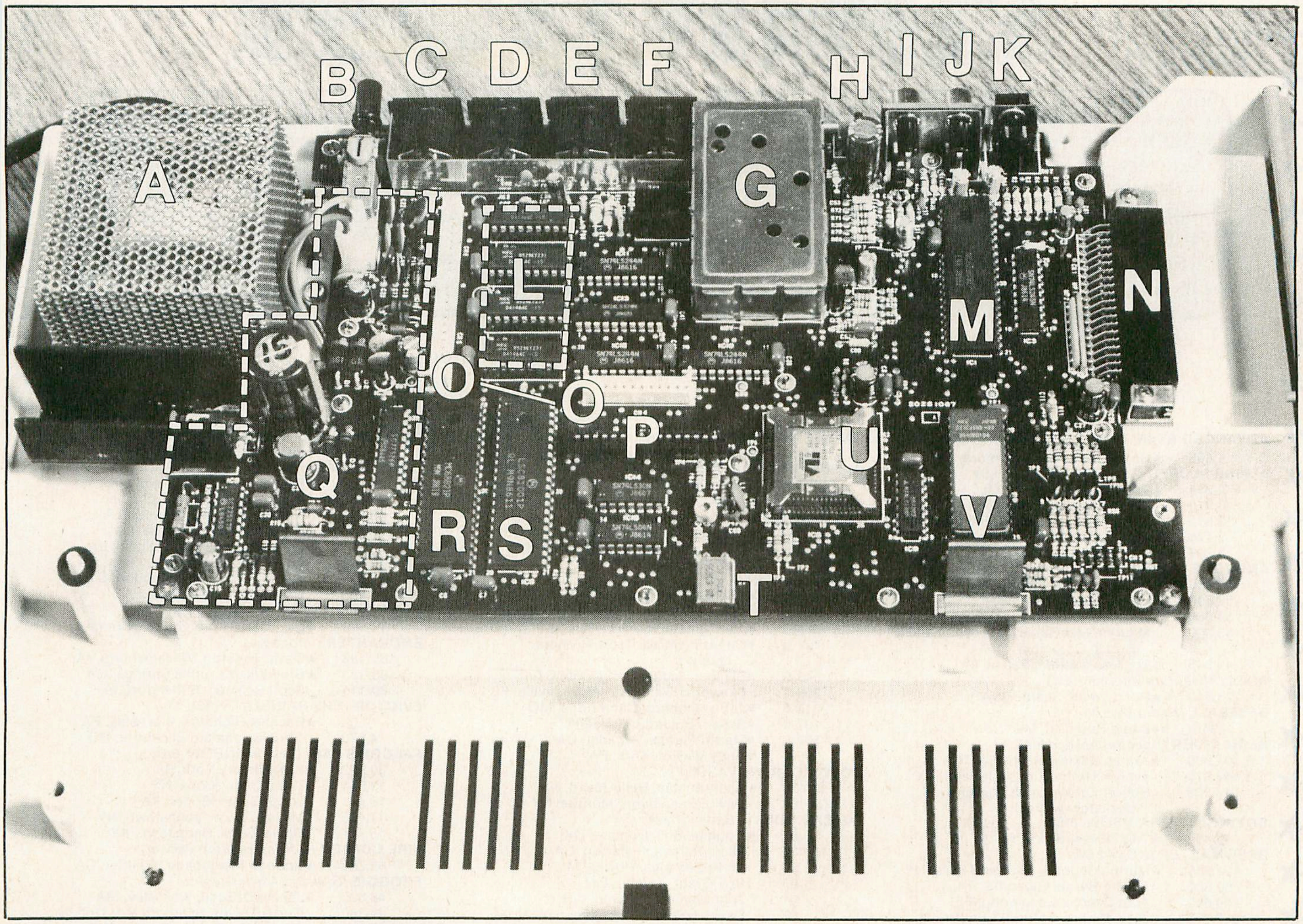
** Not shown in these pictures is the RGB monitor connector on the bottom of the new Color Computer. It is a 10-pin header connector unlike the DB9 connectors used by other manufacturers. However, only nine slots on the monitor connector are used and one pin is blocked to eliminate the possibility of plugging the monitor in backwards. For more information about the differences between color composite and RGB, refer to Ed Ellers' article on Page 27 of the September 1986 issue.

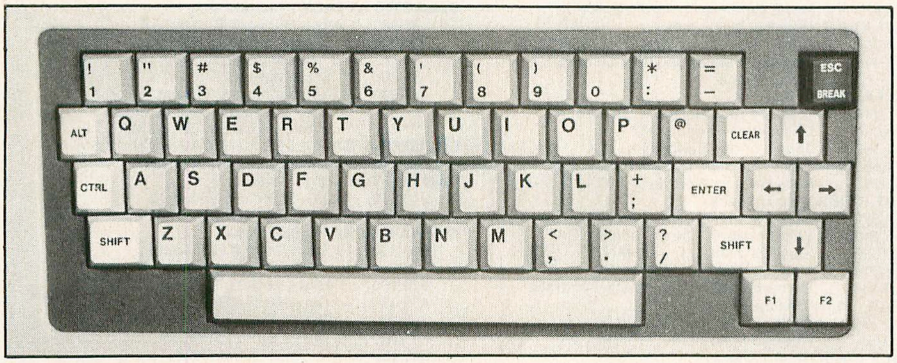
Some Observations

Many people have expressed concern about whether the Color Computer 3 supports artifact colors. The new machine does support artifact colors when used with a television or color composite monitor (an RGB monitor will produce the image, but only in black and white). However, in the past the color set chosen by the computer has been random and was selected by repeatedly pressing Reset. This was not a very reliable method. The Color Computer 3 powers up in the same configuration every time it is turned on. To change to the alternate set, hold down the F1 key and press Reset one time. The computer will switch to the alternate set. To switch back, just press Reset one time.

The Color Computer 3 is designed to operate at 0.894 or 1.788 MHz. When turned on, the machine is set to run at 0.894 MHz. However, since the new machine is always operating from RAM (contents of ROM are copied and overlayed in RAM on power-up), the RAM speed-up POKE will work. Just `POKE 65497,0` to use the 1.788 MHz clock speed. Type `POKE 65496,0` to go back to 0.894 MHz. ☐

Cray Augsburg is RAINBOW's technical assistant and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is RAINBOWMAG.

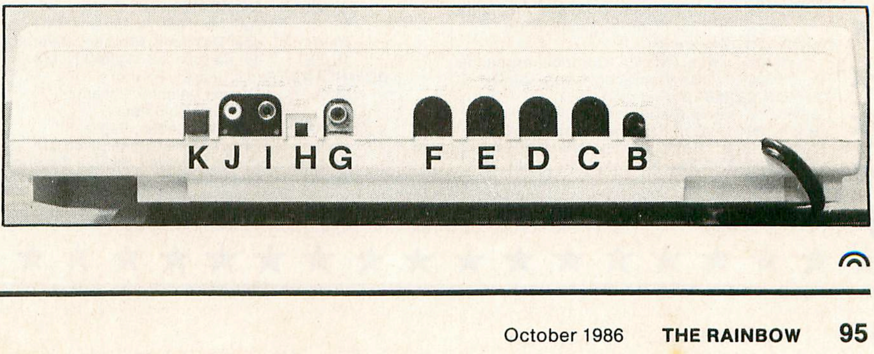

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
O
P
Q
R
S
T
U
V


! 1 " 2 # 3 $ 4 % 5 & 6 ' 7 (8) 9 0 * : = –
ESC BREAK
ALT Q W E R T Y U I O P @ CLEAR ↑
CTRL A S D F G H J K L + ; ENTER ← →
SHIFT Z X C V B N M < , > . ? / SHIFT ↓
F1 F2

Above: A view of the Color Computer 3's circuit board as seen when looking from the front of the computer. The keyboard has been removed and the RGB monitor jack is mounted beneath the board on the right-hand side.

Left: A view of the Color Computer 3's keyboard. The two function keys are on the bottom-right, while the CONTROL and ALT keys are on the left side.

Right: The back of the Color Computer 3. All letter designations coincide with those in the circuit board view as well as those in the text.


K J I H G
F E D C B

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — **legibly** — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW. The "Rainbow Scoreboard" is now a bimonthly feature.

For greater convenience, your high scores may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)

1,800	★Chris Goodman, Baltimore, MD

ALPINE SLOPES (THE RAINBOW, 12/85)

4,254	★Todd Wirtz, Midland, MI
3,970	Steven Bullard, Allen, OK
3,851	Michael Wolcheski, Meriden, CT
3,478	Rick Busse, Granite City, IL
3,299	Neil Edge, Williston, FL

ANDRONE *(Radio Shack)*

58,200	★Scott Bellman, Bettendorf, IA
57,300	Mitch Hart, Seattle, WA
54,300	Daphnie Phillips, Evansville, WI
53,500	Maurice MacGarvey, Dawson Creek, British Columbia
40,585	Theresa Juetten, Pelkie, MI

AREX *(Adventure International)*

25,640	★Don Lyman, Seattle, WA

BASEBALL *(Radio Shack)*

96-0	★●Eddie Roginski, Mertztown, PA

BEAM RIDER *(Spectral Associates)*

6,004,000	★James Oakley, Nashville, TN
3,042,470	Evelyn Thompson, Nederland, TX
747,200	Robert Eering, Swift Current, Saskatchewan

BOXING (THE RAINBOW, 8/86)

480	★Talib Khan, Bronx, NY

BREWMASTER *(NOVASOFT)*

451,650	★Martha St.John, Highland Falls, NY
386,600	Steven Byrne, Gibsonia, PA
279,600	Alan Drazen, Longwood, FL
216,350	Jean-Francois Morin, Loretteville, Quebec
166,175	Scott Purrone, Roselle Park, NJ
161,725	Martin Parada, Arcadia, CA

BUBBLE WARS (THE RAINBOW, 2/86)

75,100	★Rachael Richards, Blakeslee, PA
30,850	Daniel Cecil, Bardstown, KY
26,900	Derek Leidig, Clinton, NY
25,700	Jason Munson, Tucson, AZ
22,600	Brian McGuire, Golden, CO

BUSTOUT *(Radio Shack)*

37,900	★Gordon Rock, Davenport, IA
21,850	Charles Egglesfield, Sault Ste Marie, Ontario
21,630	Tanya Maestas, Denver, CO
21,236	Mike McCafferty, Idaho Falls, ID
18,403	Chris Zepka, North Adams, MA
1,266	Andy Walker, York, PA

BUZZARD BAIT *(Tom Mix)*

4,455,150	★Paul Rumrill, Gales Ferry, CT
3,091,700	Blossom Mayor, East Greenbush, NY
1,133,850	Rupert Young, Sheffield, MA
980,500	Fruber Malcom, Culpeper, VA
847,400	Gordon Rock, Davenport, IA
174,300	Mark Herpst, San Diego, CA

CALIXTO ISLAND *(Mark Data)*

113	★Jeff Hillison, Blacksburg, VA
115	Luis Mejico, Cordoba, Argentina
166	Chad Gott, Evangeline, LA

CANDY CO. *(Intracolor)*

141,403	★Luis Mejico, Cordoba, Argentina
103,306	Kirk Nedrebeg, Liverpool, OH

CANYON CLIMBER *(Radio Shack)*

9,988,000	★Brannon Baxley, Live Oak, FL
9,129,100	Gary Mohnsen, Tucson, AZ
1,763,399	Billy Gavin, Bossier City, LA
1,428,600	Chad McClellan, Rushville, IN
1,347,800	Lucy Dorego, Leamington, Ontario
79,400	Jared Hunter, Rochester, NY
29,800	Jennie Driscoll, Wellesley, MA

CASTLE (THE RAINBOW, 6/86)

10,216	★Kirby Smith, York, PA

CHOPPER STRIKE *(MichTron)*

46,800	★Christopher Conley, North Attleboro, MA

THE COCO ZONE (THE RAINBOW, 4/86)

146	★W.E. Veenschoten, Birmingham, AL
173	Lori & Jeff Morrish, New Market, Ontario

COLOR BASEBALL *(Radio Shack)*

999-0	★●Erik Munson, Tucson, AZ
814-1	Frank D'Amato, Brooklyn, NY
814-0	●John Licata, Richton Park, IL
707-0	●Chislain Chillis, Trois-Rivieres, Quebec
549-0	●Skipper Taday, East Lyme, CT
256-4	Ellsworth Summers, Jacksonville, FL
214-0	●John Hubbard, Cambridge, MO
107-0	●Steven Bullard, Allen, OK
102-0	●Martin Parada, Arcadia, CA
95-0	●Andy Walker, York, PA

COLOR CAR *(NOVASOFT)*

110,454	★Scott Enman, Belle-Mead, NJ
107,864	David Entenmann, Monroe, NY

DALLAS QUEST *(Radio Shack)*

87	★Douglas Bell, Duncan, OK
89	Milan Parekh, Fullerton, CA
89	Steve Zemaitis, Howell, MI
90	Roy Grant, Toledo, OH
91	John Semonin, Akron, OH
92	David & Shirley Johnson, Leicester, NC

DEATH TRAP *(Soft Sector)*

86,748	★Douglas Pardon, Brigham City, UT
40,674	David Entenmann, Monroe, NY

DECATHALON *(Spectral Associates)*

10,304	★Bernard Florence, Croydon, Australia
9,648	Matthew Sunderland, Christchurch, New Zealand

DEMON ATTACK *(Imagic)*

244,110	★Gregory Day, Holstein, Ontario
78,010	Lisa Nebel, Phoenix, AZ
64,195	Jon Ruhnow, Duncanville, TX
57,655	Tracy Salzman, LaSalle, CO
45,775	Mike Watson, Northville, NY

DESERT RIDER *(Radio Shack)*

68,872	★Janine Freamon, Citrus Heights, CA
65,215	Skip Freamon, Citrus Heights, CA
62,329	Steve Zemaitis, Howell, MI
51,519	Michael Lizardy, Oregon, OH
50,268	Bernard Florence, Croydon, Australia

DONPAN *(Radio Shack)*

48,900	★Brett Kurtin, Roanoke, VA
20,000	Rodrigo Maldonado, Whittier, CA

DOUBLE BACK *(Radio Shack)*

2,586,300	★Eugene Roosa, Stone Ridge, NY
1,618,400	Diane Guernon, Montreal, Quebec
450,600	Michael Brennan, Calgary, Alberta
52,840	Joel MacNeil, Needham, MA
48,670	Joel DeYoung, Manson, Manitoba
16,060	Jennie Driscoll, Wellesley, MA

DOWNLAND *(Radio Shack)*

68,142	★Cooper Valentin, Vavenby, British Columbia
46,804	Theresa Juetten, Pelkie, MI
45,291	Chuck Morey, Bakersfield, CA
44,340	Christian Keyes, Stroud, Ontario
42,450	Eddie Lawrence, Pasadena, Newfoundland
18,036	Luis Mejico, Cordoba, Argentina

DRAGON BLADE *(Prickly-Pear)*

175	★Eric Crichlow, Las Vegas, NV

DRAGON FIRE *(Radio Shack)*

123,120	★Rupert Young, Sheffield, MA
46,713	Gilles Gagne, Sillery, Quebec
33,676	Nathanael Heller, Kenner, LA
30,720	Brian Matherne, Gretna, LA
21,221	Jermaine Jackson, Tallulah, LA
19,986	Owen Edson, Sherman Oaks, CA
18,529	James Nahas, New London, CT
15,260	Ed Emelett, Nanticoke, PA

DRAGON SLAYER *(Tom Mix)*

75,900	★Christian Keyes, Stroud, Ontario

ENCHANTER *(Infocom)*

185/186	★David Tarleton, Williamsburg, VA
185/183	★Brad Wilson, Lithia Springs, GA
80/115	Scott Bellman, Bettendorf, IA

EVICTOR (THE RAINBOW, 7/86)

7,500	★Rachael Richards, Blakeslee, PA
4,570	Chris Goodman, Baltimore, MD

FALCON'S LAIR (THE RAINBOW, 8/85)

30,522	★Kirby Smith, York, PA
19,554	Talib Khan, Bronx, NY
18,461	Joyce Smith, Butler, PA
17,463	Michael Scott, Johnstown, NY
15,707	Daniel Cecil, Bardstown, KY

FIRE COPTER *(Adventure International)*

43,260	★Rodrigo Maldonado, Whittier, CA

FROGGIE *(Spectral Associates)*

48,000	★Jennie Driscoll, Wellesley, MA
24,360	Curtis Taylor, Scarborough, Ontario
22,940	Carlton Taylor, Scarborough, Ontario
17,980	Chris Goodman, Baltimore, MD
11,250	Mariano Frausto, Blue Island, IL

GALACTIC ATTACK *(Radio Shack)*

98,900	★Erik Munson, Tucson, AZ
54,300	Cooper Valentin, Vavenby, British Columbia
51,300	Scott Maestas, Denver, CO
33,930	Allisont Iarosis, Owego, NY
30,870	Oren Bergman, Herzlia, Israel
21,350	Mark Herpst, San Diego, CA

GALLOPING GAMBLERS (THE RAINBOW, 12/85)

$193,527.18	★Steven Bullard, Allen, OK

GANTELET *(Diecom Products)*

243,810	★Jay Graddick, Cocoa, FL
73,460	John Straiton, Merritt Island, FL

GHANA BWANA *(Radio Shack)*

693,830	★Steve Wright, Fredericton, New Brunswick
510,160	Milan Parekh, Fullerton, CA
459,930	Gene Wells, Silsbee, TX
325,900	Rupert Young, Sheffield, MA
253,960	James Ginn, Laurel, IN
229,550	Steve Dale, Lakeland, FL
190,140	Steve Zemaitis, Howell, MI
47,980	Ben Hoft, Huntsville, AL
38,490	James Doty, Washougal, WA

GHOST GOBBLER *(Spectral Associates)*

102,540	★Greg Erickson, Lowell, MA
80,550	Olga Pichard, Lausanne, Switzerland
76,900	Ghislain Chillis, Trois-Rivieres, Quebec
76,900	Pierre Pichard, Lausanne, Switzerland
72,960	Sylvain Castonguay, Chicoutimi, Quebec
47,200	Mark Herpst, San Diego, CA

HYPERZONE *(Computerware)*

802	★Harry Hull, Martinsville, IN

SCOREBOARD

KARATE *(Diecom Products)*
10,900 ★Jim Doyle, Barrackville, WV
9,900 Scott Enman, Belle-Mead, NJ
4,200 Scott Bellman, Bettendorf, IA
KEYS OF THE WIZARD *(Spectral Associates)*
662 ★John Fulton, Boydton, VA
THE KING *(Tom Mix)*
4,092,600 ★Fruber Malcom, Culpeper, VA
2,134,600 Tim Rueb, Stevensville, MI
1,670,900 Yolanda Farr, Sayre, PA
1,500,800 Kevin Cornell, Greentown, IN
158,100 Jeff Maxwell, Lincoln, NE
106,200 Mark Herpst, San Diego, CA
KLENDATHU *(Radio Shack)*
1,347,020 ★Paul Shoemaker, Quartz Hill, CA
1,177,550 Dan Franzen, Westlake, OH
412,809 Jay Pribble, Davenport, IA
322,852 James Doty, Washougal, WA
266,362 Brian Ennis, Wilmington, NC
KNOCK OUT *(Diecom Products)*
181,085 ★Rush Caley, Port Orchard, WA
168,385 John Licata, Richton Park, IL
149,190 Daniel Lesage, Laval, Quebec
137,900 John Rogers, Rye, NH
132,465 Kirk Nedrebeg, Liverpool, OH
131,575 Jason Sullivan, Seymour, IN
KUNG FU FIGHTER (THE RAINBOW, 3/86)
870 ★Brian Matherne, Gretna, LA
LANDER *(T&D Software)*
3,250 ★Walter Hearne, Pensacola, FL
LUNAR-ROVER PATROL *(Spectral Associates)*
142,600 ★Jerry Rossano, Manassas, VA
MADNESS AND THE MINOTAUR *(Radio Shack)*
240 ★John Fulton, Boydton, VA
MARBLE MAZE *(Diecom Products)*
36,354,780 ★Melvin Sharp Jr., Baltimore, MD
106,950 Dan Bouges, Niantic, CT
104,130 Jeff Maxwell, Lincoln, NE
103,560 Stephane Ouzilleau, Lauzon, Quebec
34,330 Brian Biggs, Galloway, OH
MEGA-BUG *(Radio Shack)*
20,941 ★Shelby Dunning, Sacramento, CA
18,874 Tim Rueb, Stevensville, MI
17,250 Keith Queen, Marietta, GA
14,861 Michael Clerico, Seaford, NY
14,785 Blain Jamieson, Kingston, Ontario
5,612 Luis Mejico, Cordoba, Argentina
MICROBES *(Radio Shack)*
617,950 ★Michael & David Garozzo, Morrisville, PA
161,920 John Guptill, Columbia, MO
92,610 Andy Walker, York, PA
17,900 Hiram Esparza, Blue Island, IL
MINIGOLF (THE RAINBOW, 5/86)
27 ★Brian DePlonty, Saginaw, MI
MISSION: F-16 ASSAULT *(Diecom Products)*
29,600 ★Jeanine Mason, Spencer, MA
14,900 Paul Mason, Spencer, MA
MODULE MAN *(Spectral Associates)*
14,100 ★Damon Sunderland, Christchurch, New Zealand
MONSTER MAZE *(Radio Shack)*
206,780 ★Wanda Jones, Brantford, Ontario
109,200 Joel MacNeil, Needham, MA
93,890 Rupert Young, Sheffield, MA
60,120 Steve Thomas, Ogdensburg, NY
43,610 Tim Cragg, Kahoka, MO
MOON HOPPER *(Computerware)*
376,350 ★Rene Ringuette, Riviere-du-Loup, Quebec
103,940 Paul Maxwell, Vancouver, British Columbia
102,940 Krista Cassell, Eastern Passage, Nova Scotia
100,410 Craig Cornell, Greentown, IN
80,470 Brett Bias, Enterprise, AL
MUDPIES *(MichTron)*
246,600 ★Terry Kreller, Winnipeg, Manitoba
127,200 Lisa Kohn, Canton, OH
108,800 Eddie Roginski, Mertztown, PA
77,900 Erik Huffman, Rochester Hills, MI
68,600 Edward McGoldrick, Brooklyn, NY
65,400 Anthony Farina, Brooklyn, NY
NINJA WARRIOR *(Programmer's Guild)*
753,000 ★Rich Fiore, Clemson, SC
268,200 Vivian Buterin, St. John, MO
181,200 Robert Mercredi, Winnipeg, Manitoba
164,400 Terry Kreller, Winnipeg, Manitoba
108,000 Eric Gladstone, Ocala, FL
ONE-ON-ONE *(Radio Shack)*
1,006-57 ★Elliot Alfred & Ian Hanson, Houston, TX
994-28 Chad Johnson, Little Rock, AR
986-22 Toby Jacobs, Bellefontaine, OH
970-32 Wes Hill, Vashon, WA
969-0 •Erik Huffman, Rochester Hills, MI
PANIC BUTTON *(Radio Shack)*
1,590 ★Eric Sessions, Stateline, NV
1,340 Chris Tripp, Goldsboro, NC
1,120 Nathanael Heller, Kenner, LA
PAPER ROUTE *(Diecom Products)*
337,550 ★Lawrence Elman, Smithtown, NY
249,000 Jami Foster, Maryville, TN
98,200 Jeanine Mason, Spencer, MA
20,650 Moe Tindell, Sebring, FL
PEGASUS AND THE PHANTOM RIDERS *(Radio Shack)*
250,200 ★Leon Kornbluth, Richfield, NJ
63,890 Milan Parekh, Fullerton, CA
50,200 Rodrigo Maldonado, Whittier, CA
PHANTOM SLAYER *(Med Systems)*
398 ★Marc Gagnon, Cap-de-la-Madeleine, Quebec
244 Bernard Florence, Croydon, Australia
PINBALL *(Radio Shack)*
84,650 ★Erick Newman, Willseyville, NY
PITFALL II *(Activision)*
194,000 ★Michael Wallace, Bronx, NY
173,884 Brian Biggs, Grove City, OH
170,248 Donald Williams, Prince George, British Columbia
142,152 Don Lyman, Seattle, WA
125,836 Moe Tindell, Sebring, FL
19,335 Chad Johnson, Little Rock, AR
PITSTOP II *(Epyx)*
54 ★James Doty, Washougal, WA
15 Randy Heckman, La Mirada, CA
9 Walter Hearne, Pensacola, FL
9 Jeff Maxwell, Lincoln, NE
POLARIS *(Radio Shack)*
55,278 ★Moe Tindell, Sebring, FL
33,770 Gene Murphy, Ft. Worth, TX
POLTERGEIST *(Radio Shack)*
7,430 ★Myriam Ferland, Trois-Rivieres, Quebec
6,000 Billy Fairfull, Charleston, SC
4,840 Steve Thomas, Ogdensburg, NY
4,825 Jeff Gorney, Glen Lyon, PA
4,065 Joseph Tokarz Jr., Blossburg, PA
POOYAN *(Datasoft)*
97,500,000 ★Rich Fiore, Clemson, SC
3,785,000 Ben Collins, Clemson, SC
1,987,000 Jon Sowle, Sanford, FL
1,546,000 Jason Maxwell, Manchester, TN
1,253,200 Thomas Mayor, Brooklyn, NY
197,300 Theresa Juetten, Pelkie, MI
107,850 Matthew Sunderland, Christchurch, New Zealand
POPCORN *(Radio Shack)*
165,180 ★Matt Heinemann, Richmond, VA
116,630 Keith Aschemeier, Napoleon, OH
57,680 Melita Boudreault, Port-Cartier, Quebec
56,500 Bruce Johnson, Vavenby, British Columbia
50,210 Scott Swedis, Spencer, MA
39,890 Elliot Alfred, Houston, TX
21,380 Stacie Helfers, Sparta, IL
PRO GOLF *(Computerware)*
68 ★Steven Byrne, Gibsonia, PA
69 David Esarey, Shelbyville, IN
PROJECT NEBULA *(Radio Shack)*
3,815 ★Christopher Romance, Massapequa Park, NY
345 Ian Hanson & Elliot Alfred, Houston, TX
150 Mariano Frausto, Blue Island, IL
QUIX *(Tom Mix)*
999,999 ★Wilbur James, Charleston, WV
49,000 Richard Curran, Fredericton, New Brunswick
38,014 Christopher Conley, North Attleboro, MA
22,454 Mariano Frausto, Blue Island, IL
16,270 Mark Motel, Blue Island, IL
RADIO BALL *(Radio Shack)*
4,510,740 ★Les Dorn, Eau Claire, WI
1,945,110 Dominic Deguire, St. Basile, Quebec
1,330,500 Sara Grace, Baltimore, MD
1,301,350 Brian Matherne, Gretna, LA
1,060,250 Pat Mulhern, Newark, CA
973,990 Philippe Gosselin, Montreal, Quebec
956,100 David Thomas, Parkersburg, WV
758,850 James Thomas, LeSage, WV
528,000 Harold Matherne Jr., Gretna, LA
REACTOIDS *(Radio Shack)*
76,085 ★Joel DeYoung, Manson, Manitoba
5,230 Chris Tripp, Goldsboro, NC
RETURN OF THE JET-I *(ThunderVision)*
182,661 ★Andrew Wootten York, Aiken, SC
ROBOTTACK *(Intracolor)*
1,020,800 ★Ian MacLachlan, Bethany, Ontario
975,850 Erik Huffman, Rochester Hills, MI
931,250 Keith Smith, Bethany, Ontario
637,600 Chad McClellan, Rushville, IN
599,150 Douglas Hauk, Peoria, IL
ROMMEL 3-D *(MichTron)*
499,400 ★Stephen Charchuk, Yarmouth, Nova Scotia
84,000 Todd Hooge, Comox, British Columbia
68,200 Marc Gagnon, Cap-de-la-Madeleine, Quebec
62,700 Paul Seng, East Lansing, MI
55,300 George Mealer, Riverdale, GA
RUN FOR YOUR LIFE (THE RAINBOW, 4/85)
121,000 ★Kirby Smith, York, PA
80,000 Brian Jensen, Drayton Valley, Alberta
50,000 Karen Goddard, Oshawa, Ontario
20,000 David Craft, Roanoke, VA
20,000 Ryan Devlin, Louisville, KY
20,000 Brian Voges, Jasper, IN
10,000 Luis Mejico, Cordoba, Argentina
SAILOR MAN *(Tom Mix)*
997,300 ★John Licata, Richton Park, IL
983,300 Gabriel Assel, Cameron, MO
879,100 Alan Drazen, Longwood, FL
741,100 Bryan Jenner, Calgary, Alberta
587,600 Kevin Cornell, Greentown, IN
399,900 Rich Fiore, Clemson, SC
367,800 Paul Mason, Spencer, MA
347,900 Matthew Sunderland, Christchurch, New Zealand
342,200 Damon Sunderland, Christchurch, New Zealand
208,700 Don Lyman, Seattle, WA
SAM SLEUTH P.I. *(Computerware)*
10 ★John Fulton, Boydton, VA
SEA DRAGON *(Adventure International)*
51,610 ★Jason Barney, Renton, WA
23,300 Scott Enman, Belle-Mead, NJ
21,200 George Frausto, Blue Island, IL
19,630 Jorge De Albertis, Lima, Peru
SHAMUS *(Radio Shack)*
190,280 ★Damon Sunderland, Christchurch, New Zealand
27,510 Craig Schindler, Cambridge, Ontario
24,000 Frank Pruet, San Diego, CA
17,300 Rodrigo Maldonado, Whittier, CA
16,805 Arne Peterson, Lake City, FL
SHENANIGANS *(Mark Data)*
90 ★Roy Grant, Toledo, OH
90 ★Jeff Hillison, Blacksburg, VA
90 ★Paul Maxwell, Vancouver, British Columbia
95 David Kay, Winnipeg, Manitoba
99 Ed Emelett, Nanticoke, PA
SHOCK TROOPER *(Mark Data)*
214,203 ★Fruber Malcom, Culpeper, VA
150,490 Erik Huffman, Rochester Hills, MI
100,040 Rodney Mullineaux, Gig Harbor, WA
69,328 Gordon Alvarnaz, Taunton, MA
49,438 Alex Seliger, Lachine, Quebec
40,699 Martin Parada, Arcadia, CA
SHOOTING GALLERY *(Radio Shack)*
228,610 ★Michael Clerico, Seaford, NY
227,840 Cliff Farmer, McGregor, TX
35,000 Bruce Johnson, Vavenby, British Columbia
26,610 Jeff Gorney, Glen Lyon, PA
18,500 Ken Dewitt, Blue Island, IL
SKIING *(Radio Shack)*
0:56 ★Jason Munson, Tucson, AZ
0:56 ★Leslie Sherman, Shallowater, TX
0:59 Tim North, Emporia, KS
1:00 Scott Clevenger, Fairmount, IN
1:00 Billy Fairfull, Charleston, SC

1:10	Kevin Gallagher, Santa Monica, CA
1:13	Anthony Perez, Westminster, CA
1:13	Chris Wright, Fredericton, New Brunswick
SLAY THE NERIUS *(Radio Shack)*	
480,671	★Jason Munson, Tucson, AZ
294,808	Joyce Walcott, Mt. Clemens, MI
217,195	Christian Keyes, Stroud, Ontario
57,764	Maurice MacGarvey, Dawson Creek, British Columbia
SPACE SHUTTLE SIMULATOR *(Tom Mix)*	
560	★Robert Helfers, Sparta, IL
SPEED RACER *(MichTron)*	
145,400	★Brian King, Orlando, FL
142,720	Erik Huffman, Rochester Hills, MI
142,310	Kevin Cornell, Greentown, IN
142,100	Chris Harrison, Brooks, KY
139,210	Alan Drazen, Longwood, FL
92,360	Eddie Lawrence, Pasadena, Newfoundland
86,880	Steve Nudelman, Brooklyn, NY
SPIDERCIDE *(Radio Shack)*	
1,740	★Joel DeYoung, Manson, Manitoba
1,730	Jason Munson, Tucson, AZ
1,540	Blake Cadmus, Reading, PA
STAR BLAZE *(Radio Shack)*	
8,750	★Jon Larson, Seligman, AZ
8,750	★Kent Pirkle, Cumming, GA
8,400	John Guptill, Columbia, MO
8,200	Chris Coleman, Meriden, CT
8,100	Curtis Frazier Jr., Enterprise, AL
7,300	Chris Tripp, Goldsboro, NC
6,500	Jason Munson, Tucson, AZ
5,400	Mark Herpst, San Diego, CA
STARLORD (THE RAINBOW, 8/86)	
46,440	★Talib Khan, Bronx, NY
STELLAR LIFE-LINE *(Radio Shack)*	
347,420	★Steven Smith, Matthews, NC
78,600	Don Johnson, Winnipeg, Manitoba
58,580	Stefan Mecay, Austin, TX
37,550	Michelle Wyner, Bloomfield, MI
29,500	Shane Thompson, Cape Girardeau, MO
STORM *(Computerware)*	
4,305	★Rodrigo Maldonado, Whittier, CA
SUPER ROOTER (THE RAINBOW, 5/86)	
7,360	★Robert Shymanski, Superior, MT
TEMPLE OF ROM *(Radio Shack)*	
1,422,400	★Timothy Bishop, Jacksonville, FL
959,400	Sonya Hurst, Richmond, CA
938,800	Christopher Romance, Massapequa Park, NY
219,300	Maurice MacGarvey, Dawson Creek, British Columbia
207,800	Jeanine Mason, Spencer, MA
130,700	Paul Mason, Spencer, MA
109,700	Eddy Learnard, Williston Park, NY
10-METER PLATFORM DIVING (THE RAINBOW, 9/85)	
262	★Brian Matherne, Gretna, LA
TO PRESERVE QUANDIC *(Prickly-Pear)*	
67	★Jeff Hillison, Blacksburg, VA
TREKBOER *(Mark Data)*	
142	★Joshua Henderson, Amherst, OH
VARLOC *(Radio Shack)*	
1,850	★Michael Batalon, Ninole, HI
THE VORTEX FACTOR *(Mark Data)*	
80	★Bernard Fritz, Diamond Springs, CA
WILDCATTING *(Radio Shack)*	
300,741	★Jason Munson, Tucson, AZ
ZAXXON *(Datasoft)*	
2,061,000	★Byron Alford, Raytown, MO
1,300,500	Dan Brown, Pittsford, NY
253,400	Bob Dewitt, Blue Island, IL
159,500	Thomas Mayor, Brooklyn, NY
132,300	Roy Geeo, Hot Springs, AR
108,200	Tracy Nahas, New London, CT
97,500	Christopher Conley, North Attleboro, MA
85,400	Douglas Shymanski, Priest River, ID
82,600	Tina Helfers, Sparta, IL
62,500	Walter Hearne, Pensacola, FL
47,200	David Anderson, Midlothian, VA
ZONX (THE RAINBOW, 10/85)	
21,100	★Phillip Johnson, Scottsville, VA
14,300	Dale Taylor, Chattanooga, TN
13,600	Michael Etchason, Sauk Rapids, MN
6,600	Roy Geeo, Hot Springs, AR
6,300	Jeffry Long, Butler, PA
5,300	Jason Maxwell, Manchester, TN

— Debbie Hartley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

FEEDBACK

Scoreboard:

In response to Eric Crichlow's letter (August 1986) regarding *Trekboer*, there is no second spider. If you don't do away with the first spider, it will regain consciousness and you won't get a second chance to do away with it. To get rid of it for good, `FEED SPID, CAPS, E, S, N, W, GET SPID, E, S, GO DOOR, P SPID, G PLAN, GO DOOR` and `PRES RED`. You'll have to take it from there.

Can anyone help me? I'm stuck in the game *Raiders*, by Prism Software. What do you *say* to the lady in the airport to make her give you the canteen? I hope someone out there will be able to help me! Write to the "Scoreboard."

Bette A. Hatcher
Norwalk, CA

Scoreboard:

In response to Mr. Cotton's letter (August 1986), concerning *Trekboer*, when you're at the bridge on Alton, go east and tie the rope to the tree. Then go back to the bridge (make sure you have the capsule and the amulet) and cross it. When you're on the bridge, go north. You'll figure it out from there.

Wilfred Arndt
Ambler, PA

Scoreboard:

In response to Arne Peterson's letter (August 1986) and my own (July 1986) about *Dallas Quest*, to get the cannibals to let you pass at the cave entrance, you must do something with the ring.

I need help with *Pitfall II*. Send any help to the "Scoreboard."

Rodrigo Maldonado
Whittier, CA

CORRECTION

Scoreboard:

I had a letter published in the "Scoreboard Pointers" section (July 1986) entitled "Fighting Keys." The keys were misprinted. The '2' key should be the 'Z' key and the '1' should be the '/' (slash key).

John Licata
Richton Park, IL

Editor's Note: Thank you, John, for pointing out the errors in your letter. Once again, we must impress the *importance* of printing legibly (or perhaps even typing) when submitting scores, and *especially* pointers.

STAYIN' ALIVE

Scoreboard:

I have a few hints for the game *Robottack*. First of all, it is much better if you play using two people; one controlling the movement, the other controlling the firing.

Secondly, I found that it is best to move out of the way of the robots, then, holding down the button for rapid fire, blow a path through the robots so that you may save a few humans. This method may not score as many points (due to the fact that you usually don't have time to get all the humans before the screen clears and you go to the next level), but I have found you stay alive longer. Using this method with a friend, we successfully made it up to Level 89!

Scott Enman
Belle-Mead, NJ

KEEP MOVING

Scoreboard:

I have a few tips for the game *Lunar-Rover Patrol*. When being bombarded from the air, keep moving, slow down and speed up. If you are about to be hit with a diagonal shot from the upper-left of the screen, speed up and jump — it may miss you. Shoot the ones that drop straight down on you and dodge the others.

In the boulder section, keep firing and slow down gradually. Keep the joystick to the left, jumping over or shooting the small boulders and shooting the big ones.

Jerry Rossano
Manassas, VA

HIT 'EM FROM BEHIND

coreboard:

I have a tip for *Shock Trooper* players. efore you leave the first stage, wait for the obots at the top of the screen *behind* where they appear. When they appear, hoot left and when they turn around grab ourself 500 points! I have gotten up to 2,000 points by doing this.

Bernard Florence
Croydon, Australia

RIGHT COMBINATION

Scoreboard:

Many people seem to have trouble with *Madness and the Minotaur*, including me. cannot find the solution to the Scorpion, herefore I haven't been able to beat it after lmost three years. However, I feel qualified to give a few tips.

Most important, be sure to save the ame on tape before making the first move, nd again every time you make progress. The game changes each time you start over rom the beginning.

Believe the instruction manual. All 256 ooms are accessible and the first spell eally is automatic when you get the right ombination of objects (i.e., Food and Mushroom).

Kill the Sprite ASAP to stop it from moving things around where you can't find them anymore.

Drop unneeded items for landmarks when exploring the maze.

John W. Meredith
Enterprise, AL

VINES SUBLIME

Scoreboard:

I have some advice for beginning *Raaka-Tu* players. To get the gold coin, the guards have to go left. To make them march left, go to the vines and climb them. You should fall and the guards will kill you. Now, when you start again, go west, south and west. Then, get the coin and go north to the vines; climb them. You should fall through the roof and land in the temple.

If you fall from the vines, don't worry. The guards will always go left when you are killed at the north wall.

Dawn Daniels
San Antonio, TX

PRAY FOR HELP

Scoreboard:

Here are some tips for *Zork I*. In the loud room, type `ECHO`.

Pray at the Altar — this will help more than you expect.

You should put all your treasures in the trophy case.

If you have trouble turning the bolt on the dam, try pressing some of the buttons in the maintenance room.

Does anybody know what to do with the magic gunk?

Frank Heezen
Poquoson, VA

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Debbie Hartley

PRINTERS!!!

NEW! Star Micronics NX-10	$295
Okidata 192 (Parallel)	$370
Okidata 192 (Serial)	$425
Okidata 182	$240
Silver Reed 550 (Daisy Wheel)	$395
Silver Reed 400 (Daisy Wheel)(Par. or Serial)	$200

Other Printers, Monitors, and Accessories for CoCo and IBM upon request.
$15 off interface with purchase of printer.
Find your cheapest published price and we'll beat it!!!

SP-2 INTERFACE for EPSON PRINTERS:

- 300-19,200 BAUD rates
- Fits inside printer — No AC Plugs
- Optional external switch ($5.00 extra) frees parallel port for use with other computers
- $49.95 (plus $3.00 shipping)

SP-3 INTERFACE for MOST OTHER PRINTERS:

- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for Y-cables or plugging/unplugging cables
- $64.95 (plus $3.00 shipping)

Both also available for IBM, RS-232 and Apple IIC computers.

DISK DRIVE SYSTEMS

ALL ½ HEIGHT DOUBLE SIDED

Drive 0 (addressed as 2 drives!)	$235
Drive 0,1 (addressed as 4 drives!)	$350

All above complete with HDS controller, cable, & drive in case with power supply

Bare Double Sided Drives	$109
Dual ½ Height Case w/Power Supply	$49
Double Sided Adapter	$25
HDS Controller, RS ROM & Instructions	$99
25 CDC DS/DD Diskettes	$32 & $3 s/h

We use the HDS controller exclusively. Can use 2 different DOS ROM's.
Shipping Costs: $5/drive or power supply, $10 max.
Co Co Serial Cables 15 ft.—$10. Co Co/RS-232 Cables 15 ft.—$20.
Other cables on request. (Add $3.00 shipping)

C N R ENGINEERING

P.O. Box 293
Raritan, NJ 08869
(201) 722-1055

16K
ECB

Use this technique to track down FC Errors

Don't String Me Along

By Ellen and George Aftamonow

Most computers don't hesitate to tell us where we went wrong and what sort of mistake we made this time. We are all too familiar with SN Error in 100, TM Error in 250, etc. In each case, one simply looks at the given line number and corrects it.

However, this is not necessarily the case with the FC (function call) Error. All too often an examination of FC Error shows that the given line number has no error in it at all. Many people then sit down and pen a letter to the author or the magazine to proclaim that the program does not work. But, before we're so quick to blame the program, we should do a little detective work.

When you get an FC Error message, first check the given line. If the line is correct, then the most likely suspect is a previously defined string. For instance:

```
100 I$(1)="U8BR3R2ND8R2BD8"
110 W$="BR5L2NU5L2HU7BR6D7GBR4"
120 O$="U8R4D8NL4BR2"
130 R$="U8R4FD2GL2F4BR2"
140 K$="U8BD4NE4F4BR2"
150 S$="BRNHR4EU2HL4HU2ER4BR4BD8
"
160 PL$="T200L100O4AAABBBCCC"
170 PMODE3,1:SCREEN1,1:PCLS
180 DRAW"BM70,100S8XI$(1);BR8XW$
;XO$;XR$;XK$;XS$;":PLAYPL$
190 FORX=1TO5000:NEXTX
```

In this example, if the CoCo greets us with an FC Error in 180 and Line 180 lists correctly, we should backtrack to lines 100 through 160, where we first defined the various strings. All Line 180 does is execute the strings that appear in lines 100 through 160. So it stands to reason that if a string was defined wrong, Line 180 cannot be executed, thus the FC Error.

The easiest way to pick out the culprit is to insert a quote and `REM` (″′) after a suspect string, using the edit mode. Thus, Line 180 becomes:

```
180 DRAW"BM70,100S8XI$(1);"'BR8X
W$;XO$;XR$;XK$;XS$;":PLAYPL$
```

If the program reaches Line 190, then the error was not in `I$(1)` in Line 100. So delete the ″′ and insert them after the next string.

```
180 DRAW"BM70,100S8XI$(1);BR8XW$
;"'XO$;XR$;XK$;XS$;":PLAYPL$
```

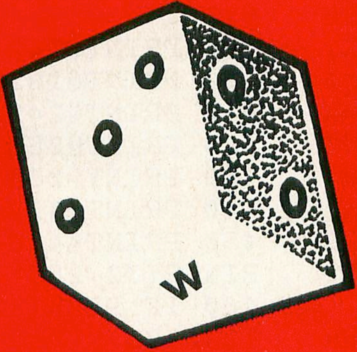
Continue in this manner until you get the FC Error. You will then know which string has the error and you can look for an error in the line where the string is defined. Often times it is the letter 'I' which should have been number one, the letter 'O' which should have been number zero, or the letter 'B' which should have been number eight. So when you see an FC Error, don't let it string you along.

(Questions about this technique may be directed to the authors at 46 Howe Street, Milford, CT 06460, 203-878-3602. Please enclose an SASE when writing.)

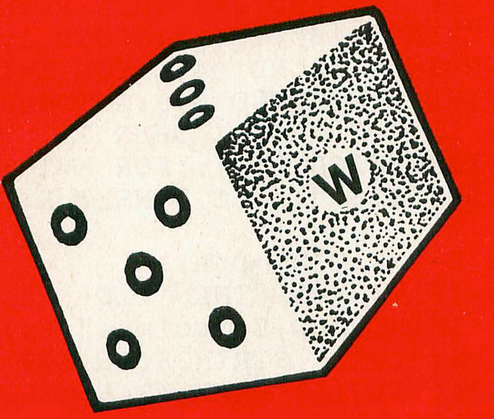
The Aftamonows are self-taught programmers living in Milford, Connecticut. Ellen holds a degree in math and concentrates on the structure of the program, while George creates and designs graphics.

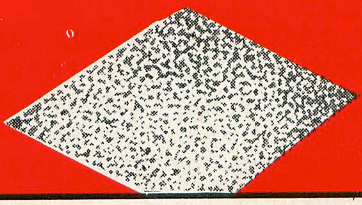
A Greedy Man's Comeuppance is the Double Whammy

Double Whammy



By Bill Bernico





I would like to share my first game with the rest of the readers. It's called *Whammy*, and it's based on the old dice game, Skunk.

The object of *Whammy* is to acquire a preset number of points before your opponent does. Each player takes turns rolling the dice. You may roll as many times as you like, provided you don't roll a one, which in this game is represented by a 'W' (for *Whammy*).

With each roll, you accumulate the number of points made on that roll. If you choose not to roll again, you keep the points accumulated during that turn. Roll a one (W) and you lose all the points from that turn and the dice are passed to the next player. If you roll two ones (Ws), it's a double whammy and you lose all the points you have earned throughout the game. That's especially aggravating near the end when you have more to lose.

There's some skill required to know when to stop and pass the turn to someone else, but this game has the one element that is essential to a good game — greed. The temptation to roll just one more time when you're behind makes for some excitement during the game.

One last note on the screen presentation used. It contains the statement `POKE 359,60:SCREEN 0,1` to turn the screen a shade of orange when a whammy is hit. Simply follow the next direction on the screen and press ENTER to continue. The screen will return to normal. If you should press the BREAK key while the screen is orange, the program will hang up. Just press the Reset button, type `POKE 359,126` and press ENTER. It won't show up on the screen, but the fix will be made and you'll see the green screen with the `OK` prompt once again.

(Questions about this program may be directed to Mr. Bernico at 708 Michigan Avenue, Sheboygan, WI 53081, 414-459-7350. Please enclose an SASE when writing.) ☐

Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wisconsin.

150	100	600	163
280	218	700	174
480	121	END	59

The listing: WHAMMY

```
10 ' THE GAME OF WHAMMY
20 ' BY BILL BERNICO
30 ' 708 MICHIGAN AVE.
40 ' SHEBOYGAN, WI 53081
50 ' (414) 459-7350
60 '
70 D=0:E=0:F=0:G=0:H=0:I=0:J=0:K
=0:L=0:Z=43345
80 C$=CHR$(170):D$=CHR$(165):E$=
CHR$(172):F$=CHR$(163):Y$=CHR$(1
59):R$=CHR$(191):L$=CHR$(175)
90 CLS:PRINT@136,"THE GAME OF wh
ammy
100 PRINT@201,"BY BILL BERNICO
110 PRINT@0,STRING$(32,223);:PRI
NT@480,STRING$(31,223);:POKE1535
,223:FORX=32TO448STEP32:PRINT@X,
CHR$(223);:NEXT
120 FOR X=31 TO479STEP32:PRINT@X
,CHR$(223);:NEXT:PRINT@33,STRING
$(30,207);:PRINT@449,STRING$(30,
207);
130 FORX=65TO417STEP32:PRINT@X,C
HR$(207);:NEXT:FORX=94 TO 478 ST
EP32:PRINT@X,CHR$(207);:NEXT
140 PRINT@66,STRING$(28,239);:PR
INT@418,STRING$(28,239);:FORX=98
TO386STEP32:PRINT@X,CHR$(239);:N
EXT
150 FORX=125TO413STEP32:PRINT@X,
CHR$(239);:NEXTX:SOUND89,3:SOUND
109,3:SOUND125,3:SOUND109,3:FORX
=1TO120:NEXT:SOUND125,3:SOUND89,
3:FORX=1TO200:NEXT:SOUND175,2
160 PRINT@358,"HIT ANY KEY TO BE
GIN";:EXEC44539
170 CLS:PRINT"NUMBER OF PLAYERS
(1-4)";:FOR X=1024 TO 1046:POKE
X,PEEK(X)-64:PLAY"O5T60B":EXEC Z
:NEXT X:INPUT F
180 IF F<1 OR F>4 THEN 170
190 PRINT@32,STRING$(32,150);
200 FOR G=1 TO F
210 PRINT:PLAY"O5T60B":EXEC Z:PL
AY"O4B":EXEC Z:PLAY"O5B":EXEC Z:
PLAY"O4B
220 PRINT"PLAYER #";G;:INPUT A$(
G):NEXT G
230 H=RND(F)
240 PRINT@384,"POINTS NEEDED TO
WIN";:FOR X=1408 TO 1427:POKEX,P
EEK(X)-64:PLAY"O5T60B":EXEC Z:NE
XT:INPUT L
250 CLS:GOSUB 790
260 IF F>2 THEN PRINT@64,STRING$
(32,191);
270 IF F<3 THEN PRINT@32,STRING$
(64,191);
280 PRINT@96,R$;R$;A$(H)"'S TURN
";STRING$(28,191);
290 PRINT@118,"goal"L;
300 PRINT@128,STRING$(32,191);
310 I=RND(6):J=RND(6):K=I+J
320 PRINT@160,STRING$(96,175);
330 PRINT@194,"your roll";:PRINT
@205,I;:PRINT@211,J;:PRINT@219,K
;:POKE1222,32:POKE1233,43:POKE12
39,61
340 PRINT@172,C$;F$;F$;F$;D$;
350 PRINT@204,C$;L$;:PRINT@207,L
$;D$;
360 PRINT@236,C$;E$;E$;E$;D$;
370 PRINT@178,C$;F$;F$;F$;D$;
380 PRINT@210,C$;L$;:PRINT@213,L
$;D$;
390 PRINT@242,C$;E$;E$;E$;D$;
400 PRINT@185,STRING$(7,175);
410 PRINT@249,STRING$(7,175);
420 PRINT@256,STRING$(32,255);
430 PRINT@288,STRING$(32,159);
440 PRINT@352,STRING$(32,159);
450 PRINT@416,STRING$(32,159);ST
RING$(32,255);
460 IF PEEK(1230)=113 THEN POKE
1230,23
470 IF PEEK(1236)=113 THEN POKE
1236,23
480 IF I=1 AND J=1 THEN PRINT@28
8,STRING$(160,159);:SOUND 1,14:S
OUND 34,4:SOUND 44,2:FOR X=1 TO
340:NEXT X:SOUND 1,9:GOTO600
490 IF I=1 OR J=1 THEN PRINT@288
,STRING$(160,159);:FOR X=1 TO 50
:PLAY"O1T60":EXEC Z:NEXT X:GOTO6
10
500 E=E+K:D(H)=D(H)+K
510 IF D(H)=>L THEN 710
520 PRINT@320,E;"points";Y$;"thi
s";Y$;"turn";STRING$(16,159);:PO
KE1344,159:IF PEEK(1346)=96THEN
POKE1346,159
530 GOSUB 790
540 PRINT@384,D(H);"total";Y$"po
ints";STRING$(20,159);:POKE1408,
159:IF PEEK(1410)=96THEN POKE 14
10,159
550 PRINT@487,"ROLL AGAIN (Y/N)?
";:FOR X=1510 TO 1528:POKE X,PEE
K(X)-64:PLAY"O3T60F":EXEC Z:NEXT
560 B$=INKEY$:IF B$=""THEN 560
570 IF B$="Y"THEN 250
```

```
580 IF B$="N"THEN 620
590 GOTO560
600 PRINT@320,STRING$(8,159);"do
uble";Y$;"whammy";STRING$(30,159
);:PRINT@384,STRING$(4,159);"you
";Y$;"lose";Y$;"all";Y$;"your";Y
$;"points";STRING$(20,159);:D(H)
=0:GOTO 620
610 PRINT@288,STRING$(44,159);:P
RINT@332,"whammy";STRING$(47,159
);:PRINT@385,"you";Y$;"lose";Y$;
"all";Y$;"points";Y$;"this";Y$"t
urn";STRING$(34,159);STRING$(32,
255);:D(H)=D(H)-E
620 H=H+1:E=0
630 IF H>F THEN H=1
640 GOSUB 650:GOTO 250
650 PRINT@485,"HIT <ENTER> TO CO
NTINUE";:FOR X=1504 TO 1535:POKE
 X,PEEK(X)-64:EXEC43345:NEXT X
660 IF I=1 AND J=1 THEN GOSUB 84
0
670 IF I=1 OR J=1 THEN GOSUB 850
680 IF INKEY$<>CHR$(13)THEN 680
690 POKE 359,126
700 RETURN
710 PRINT@320,STRING$(32,159);A$
(H);Y$;"wins";Y$;"with";Y$;D(H);
Y$;"points";STRING$(63,159);
720 PLAY"T60O1CDEFGABO2CDEFGABO3
CDEFGABO4CDEFGABO5CDEFGAB
730 GOSUB 790
740 PRINT@487,"PLAY AGAIN (Y/N)?
";:FOR X=1510 TO 1528:POKE X,PEE
K(X)-64:PLAY"O5T60B":EXEC Z:NEXT
750 C$=INKEY$:IF C$=""THEN 750
760 IF C$="N"THEN CLS:LIST-50:EN
D
770 IF C$="Y"THEN RUN
780 GOTO 750
790 PRINT@0,A$(1);D(1)
800 IF F=>2 THEN PRINT@16,A$(2);
D(2)
810 IF F=>3 THEN PRINT@32,A$(3);
D(3)
820 IF F=>4 THEN PRINT@48,A$(4);
D(4)
830 RETURN
840 FORX=1TO5:POKE359,60:SCREEN0
,1:PLAY"O4T60F":FORY=1TO100:NEXT
Y:POKE359,126:SCREEN0,0:PLAY"O3T
60F":FORY=1TO100:NEXTY:NEXTX:RET
URN
850 POKE 359,60:SCREEN0,1:RETURN
```

WICO TRACKBALL
Now $19.95
(Was $69.95)

TOP
WICO COMMAND CONTROL

You can benefit from our recent purchase of brand new WICO Trackball Controllers at closeout prices. This model was designed specifically for the Radio Shack Color Computer and plugs right into the joystick port.

WICO is the largest designer and manufacturer of control devices for the commercial arcade video games. If you've ever played an arcade video game, chances are you've used a WICO joystick or trackball. You've experienced the superior control. The pinpont firing accuracy. The exceptional durability.

Includes one-year limited warranty. Phoenolic ball offers 360-degree movement. Two optical encoders provide split-second response. Quick-action fire button for smooth, two handed arcade response and feel. Long 5' computer connection. Heavy duty plastic case for long hard use. Compatible with all color computer models.

ORDERING INSTRUCTIONS: Specifiy CAT# C331. Include $19.95 per trackball plus $3.00 for S&H. UPS COD Add $3.00, VISA/MC Accepted. NY Residents add sales tax.

COMMAND CONTROL
COMMAND CONTROL

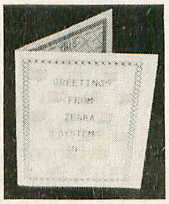
ORDER NOW!
QUANTITIES ARE LIMITED.

Zebra Systems, Inc.
78-06 Jamaica Ave.
Woodhaven, NY 11421
(718) 296-2385

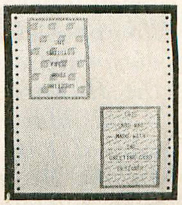
The Coco Greeting Card Designer

The Coco Greeting Card Designer can be used to design and print custom Greeting Cards for all occasions including: Valentine's Day, Birthdays, Mother's Day and more.
It's easy to use and includes a library of predrawn Hi-Res Graphic Pictures! You can write custom messages on the cover and inside your cards in a selection of character fonts and sizes. An easy to use editor allows you to pick your type style, font size, and more. Two fonts and a selection of custom border patterns are included, and the easy to use editors allow you to create many more!
The Coco Greeting Card Designer requires a Coco or Coco II with a minimum of 32k, One Disk Drive (Disk Ext. BASIC 1.0/1.1, ADOS, or JODS). Some of the printers that the Greeting Card Designer supports are: EPSON RX/FX, GEMINI 10X or SG-10, C-ITOH 8510, DMP-100/105/400/430, SEIKOSHA GP-100/250, LEGEND 808 and GORILLA BANANA. Send an SASE for current list of other compatible printers. See Review in April 86 Rainbow . . .

Only: $24.95
Plus $3.00 Shipping & Handling
NY Residents add Sales Tax.
UPS COD ADD $3.00
VISA/MC Accepted



ZEBRA SYSTEMS, INC.
78-06 Jamaica Avenue
Woodhaven, New York 11421
(718) 296-2385
Dealer Inquiries Invited



Colored Paper Packs — Now available are packs of 40 sheets of tractor-feed paper and 16 matching envelopes in bright RED, GREEN and BLUE. Perfect for making your card unforgettable!
Price $19.95

Getting to the Details of the CoCo 3

By Marty Goodman

Q. *I hear the new CoCo 3 will have an RGB output. Does this mean I can use the same RGB monitor I now use on my IBM PC?*

A. No. The new CoCo 3 does have an RGB output, but it is an RGB analog output, not the RGBI-type signal protocol used for most standard IBM PC color displays. The RGBI used by the IBM systems is characterized by its signals at TTL levels (five volts or zero volts — nothing in between). It allows for a maximum of 14 colors plus black. RGB analog allows for a great many more colors and, as such, is a superior protocol. It may be possible to modify many RGBI-type monitors to accept RGB analog signals by merely removing a chip or two inside the monitor and properly biasing the bases of the R, G, B and synch input transistors. But apart from such hacker manipulations, to fully appreciate the impressive color graphics capability of the CoCo 3 you will have to either buy the $300 CM-8 monitor from Tandy, or use one of the few other RGB analog capable monitors. Both Magnavox and Sony make a few monitors that are RGB analog capable. There are two minor variants of RGB analog. One is the kind used by the CoCo 3, where the R, G and B signals are separate and there are separate synch signals. The other is the protocol used by the Amiga computer, where the synch signal information is tacked on to the Green luminance line.

Q. *I know the CoCo 3 features much improved graphics resolution. But the CoCo 3's joystick inputs are of the same zero-to-63 low resolution as those of the old CoCo 2. How can I achieve smooth positioning of a cursor or character on the CoCo 3 screen using the joystick? Will the* CoCo Max *Hi-Res joystick help?*

A. Currently, the only way to get Hi-Res joystick control on a CoCo 3 involves one of several programming tricks: for instance, using a fine control box (like that used by *Graphicom*) or using the analog joystick as a time-controlled, four-switch joystick via a software emulation of such an Atari-type joystick. *CoCo Max*'s Hi-Res joystick hardware (and the program itself) will not work on the CoCo 3 due to the hardware using a port address that conflicts with assigned addresses used by the GIME chip in the CoCo 3. But it has been rumored that a low-cost adaptor will soon be available. It will plug in between the joystick ports and computer (on both the CoCo 2 and 3) and will greatly increase the available resolution of the joysticks. Keep an eye on new products from Tandy; help is on the way.

Q. *I am told by Tandy that all of their hardware for the CoCo 2 will be compatible with the CoCo 3. Is this so? What about hardware and software from non-Tandy sources?*

A. To the best of my knowledge, all Tandy hardware for the CoCo (Multipak, Disk controller, RS-232 Pak, Hard Disk Controller, Speech Sound Pak, and such) is fully compatible with the CoCo 3. Similarly, all third party disk controllers (those from J&M systems, HDS and Disto) should also work fine with the CoCo 3. But in order for them to work with the CoCo 3, they need to have an unmodified version of Disk BASIC 1.1. The PBJ 2SP pack is also fully compatible with the CoCo 3, as is the Disto RAM disk card. The 80-column card from PBJ will probably *not* work on the CoCo 3, although it is not needed due to the 80-column capability of the CoCo 3.

CoCo Max will not work in its current form on the CoCo 3, in part because of hardware conflicts. But it will very likely be re-released in a CoCo 3 compatible version.

Due to differences in the handling of memory on the CoCo 3, much other well-known CoCo 2 software (*Telewriter, VIP Writer, Mikeyterm, Graphicom, Color Com E, etc.) will not* work in their original forms on the CoCo 3. However, patches for these and other popular CoCo 2 programs will most likely appear soon.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW's CoCo SIG on Delphi. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

THE SUPER NEWS!

SUPER RAM -

The first 256K/512K memory board for the CoCo II ! 256K/512K of memory resides in this sturdy, low noise metal case and all the support circuitry to access it as a high speed RAMDISK! Compatible with all CoCo II's, even the 26-3127B and 26-3134A/B. (see June '86 Rainbow Review) Requires a RS Multi-Pak.

256K Board - $129.95 512K Board (Recommended for OS-9 users) - $169.95

OS-9 Driver - $24.95

SUPERCOMP -

NOW add 68008 CPU processing power to the CoCo ! Simply plug the 68K board into the Rompak port of your CoCo and attach your Disk Controller into the 68K board. Features 8/16/32 bit internal processing, parallel port, and fast DMA operation.

256K Board - $349.95 (Metal case $39.95) 256K RAMDISK Driver - $59.95

OS-9 Driver - $29.95

SUPER CONTROLLER -

The most AMAZING CoCo Disk Controller ever ! Switch up to four DOS's (up to 16K) via a single software POKE. Choose between R/S 1.0/1.1, Spectrum DOS, ADOS, JDOS Stearman DOS - $99.95 (Spectrum DOS $29.95 or ADOS $39.95 with purchase of the Super Controller - Buy 'em both for $59)

Enhanced Display 80 - Add an 80X24 display, Real Time Clock and Centronics parallel printer interface to your Super Controller ! Includes SMOOTH SCROLLING, Switchable Video Input - $149.95 (NEW OS-9 Driver for Display 80 - $24.95)

EPROM Programmer for the Super Controller - $69.95 (Uses 2764's ($4.95) or 27128's ($6.95) EPROMS)

COMM-4 -

Enhance the MULTI-TASKING & MULTI-USER features of OS-9 by providing (4) serial independent devices via DB-25 plugs on a plug-in cartridge. Allows you to hook up any combination of up to (4) terminals, modems or printers. A must for Bulletin Board Sysops ! (Call 504-340-7609 COMM-4 BBS to see a demo - 300/1200 Baud, 8 Bits, No Parity) $99.95. Requires a RS Multi-Pak.

COCO MAX II -

Feature packed hardware & software Graphics System ! Includes: Pull-Down Menus, Icon processing, multiple Font styles, full graphic editing plus a special Input Module for 256X192 joystick input. 64K DISK $79.95 - with a 'Y' Cable $99.95 CoCo Max I-II Disk Upgrade $19.95 - MaxEdit $19.95 - MaxFonts (Set of 3) $64.95

All orders plus $3.00 S/H (Foreign $5.00) – COD add $2.00 extra – NYS Residents add Sales Tax

SPECTRUM PROJECTS
PO BOX 264
HOWARD BEACH NY 11414

COD ORDER HOT LINE 718-835-1344

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

SPECTRUM PROJECTS
SOFT AND HARD WARES FOR COLORFUL COMPUTING

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

COMMUNICATION

COLORCOM/E - A complete smart terminal package! Upload, Download, Hi-Res (51X24) screen, 300/1200 Baud, Offline Printing. 32/64K Disk* - $39.95
*- Now with DELPHI & Compuserve XMODEM support! Download ML!
COMPUSERVE Starter Kit $14.95

BUY CC/E Get RS-232 "Y" Cable at Half-Price! Reg.$20 Sale $10

WORD PROCESSING

TELEWRITER-64 - Three Hi-Res screens, true lowercase char's right justify, full screen editor. Tape $49.95 Disk $59.95
TELEPATCH - A TW-64 enhancer!!! True block move, Overstrike & TSPOOL mode, Type Ahead Buffer FASTER Disk I/O 64K Disk $19.95

BUY BOTH ↔ SAVE $10

MODEMS

1200 BAUD
$129.95**

Hayes compatible! Super for the DELPHI & Compuserve CoCo Sig! 300/1200 Baud, Auto-dial/answer
** Requires Modem cable .$19.95

SEIKOSHA
SP-1000A

- 100 cps draft
- 20 cps NLQ
- Friction and tractor
- Front panel Controls
- 1.5 K buffer

$219.95

PRINTERS

GEMINI NX-10 - 120 cps, tract-frict feed, NLQ mode, 5K buffer Front Panel Controls! - $249.95
KAMELEON -Low cost Parallel Ptr Interface! 600/9600 Baud $49.95
PBH-64 - A combo Parallel Ptr interface & 64K Print Buffer ! COMPUTE while you PRINT $149.95

KEYBOARDS

RS 26-3016 Low Profile CoCo Keybd. Fits all CoCoII's, "F" & TDP-100's WAS $39.95 NOW $14.95
Adapter for D/E CoCoI's - $9.95

Monitor Stand $24.95

MONITORS

MONOCHROME MONITORS

80x24 Hi-Res screens! $79.95
Universal Video Driver - Works w/all monitors & CoCos!- $29.95
13" COLOR Monitors $169.95

SAVE $10 OFF COLORCOM/E WITH A HAYES MODEM OFF TELEWRITER-64 WITH ANY PRINTER, KEYBOARD OR MONITOR **SAVE $10**

SPEEDY COD ORDER HOT LINE - CALL 718-835-1344

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

SPECTRUM PROJECTS

SOFT AND HARD WARES FOR COLORFUL COMPUTING

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

SPREADSHEET

	Competition	DYNACALC
Screen	32X16	51X24
Precision	9 digits	16 digits
Hi-Res Graphics	NO	YES
Visicalc cmd format	NO	YES

New low price! 64K Disk $69.95
Side Wise -Print DYNACALC files up to 255 chars-sideways! $24.95

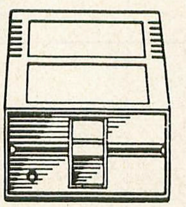
CoCo III IS HERE !!!

BUY 'EM BOTH FOR
(DYNACALC & PCF 2.0 ONLY)
$99.95

DATA BASE MANAGER

PRO-COLOR FILE 2.0 - 60 Data Flds, 8 Report Fmts, 4 Screen Fmts, 1020 bytes/record, Sort 3 Fields, Global Search, FAST ML Sort, Create Files Compatible w/DYNACALC! - Disk $49.95
Pro Color Dir and PCF Forms - Buy 'em both for only $29.95

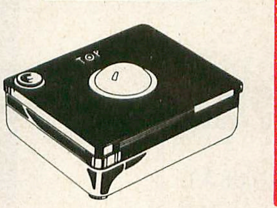
DISK DRIVES



DOUBLE SIDED DRIVE 0 $239.95

Disk Drive - 1,2 or 3 - $119.95
Top Drive for FD-501 - $119.95

GAME CONTROLLERS

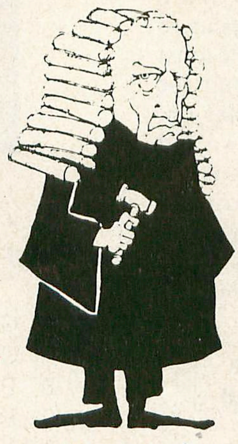


TRACKBALL $19.95*

Wico Command Adapter - Now you can hookup 2 Atari type joystks to your CoCo for only $19.95!
* Reg. $69.95 (See 9/86 review)

TANDY 1000

Want to upgrade your $699/$999 Tandy 1000 ? (See below ! ! !)
640K Upgrade - Take your 128K Tandy 1000 up to 640K and SAVE (Why pay up to $520 ?*) $169.95
Tandy 1000 2nd Drive - Add 360K of storage & SAVE MORE- $149.95
Buy 'em BOTH for only - $299.95



'You judge'

COCO II UPGRADES

Want to upgrade your new $69/$88 CoCo II? (See below !!)
4464 DRAMs - two chip 64K upgrade for 26-3134A and 26-3134B Korean CoCo II's ..$39.95
Extended BASIC - 28 pin ROM for 26-3134 A/B CoCo II's ...$34.95
Buy 'em BOTH for only - $69.95

* -Cost of RS Memory PLUS Expansion Board (25-1011) & 256K RAM kit (26-6019) 1986 Computer Catalogue - P.94

SPECTRUM PROJECTS, Inc.
PO BOX 264
HOWARD BEACH, NY 11414

CoCo Club/Dealer inquiries invited ! Software/Hardware submissions welcomed !

All orders plus $3.00 S/H (Foreign $5.00) - COD add $2.00 extra - NYS Residents add Sales Tax

Graphics Quickies

Halloween Foolery

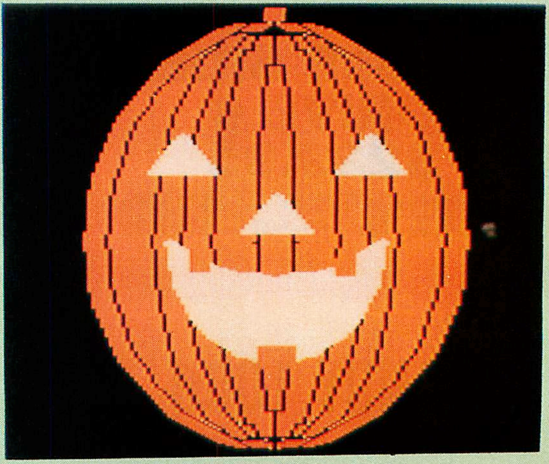
By Helene LaBonville

The Great Talking Pumpkin is a graphics display of a large jack-o'-lantern that will assist in greeting trick or treaters on Halloween night.

A small audio amplifier (such as RS #277-1008A), a microphone (with a 3.5mm miniature phone plug) and a joystick are needed to make the jack-o'-lantern appear to talk. The black plug from the computer's cassette cable must be connected to the output jack of the amplifier and the mike connected to the input jack. With the computer on, start with the amplifier volume turned all the way down and the TV or monitor volume turned up about midway. Next, enter `AUDIOON` and adjust the volume setting on the amplifier slowly, until your voice is heard on the TV speaker. Then, run *The Great Talking Pumpkin* and speak while pressing the joystick button. The Great Pumpkin lives!

32K ECB

The listing: PUMPKIN



```
0 ' TALKING PUMPKIN BY HM LaBONV
ILLE
1 ' ADAPTATION OF DAVE HOOPER'S
2 ' DRAWING FROM THE RAINBOW
3 ' OCTOBER 1982 (PAGE 104)
4 ' AND MIKE KELLER'S ARTICLE
5 ' FROM 80-MICRO (OCT82 PAGE104
)
6 GOTO8
7 GOTO9
8 PCLEAR8:PMODE4:PCLS:GOTO7
9 PMODE3,1
10 ' DRAW PUMPKIN
11 ' LINES 10-80 ARE IDENTICAL T
O HOOPER'S LINES 10-85
15 CIRCLE(128,96),90,7
20 PAINT(128,96),7,7
```

A SPECTRUM PROJECTS SHOPPING LIST

SUMMER CHIP -SALE- ...

RF Shield for D/E CoCo I's	$3.95
6821 Standard PIA ~~$9.95~~	$4.95
Basic ROM 1.1 Chip ~~$19.95~~	$7.95
Orig SAM Chip (6883) ~~$19.95~~	$9.95
6847 VDG Chip ~~$19.95~~	$9.95
6809E CPU Chip ~~$19.95~~	$9.95
Basic ROM 1.3 (Newest version)	$19.95
68769 (Fits all Basic ROMS) EPROM	$19.95
Disk ROM 1.1 (New DOS Command)	$29.95
New SAM Chip w/heatsink (74LS785)	$29.95
Ext Basic 1.1 ROM - NEW LOW PRICE	$29.95
CoCo First Aid Kit - includes two PIA's, 6809E CPU & SAM Chips ~~$59.95~~	$29.95
EPROM Eraser - 3 min erasure time	$49.95
EPROM Prgmr - 2716's up to 27512 ! Super fast programming-See 4/86 review	$149.95

COCO LIBRARY...

A History of the CoCo / 1980-1986	$3.95
New! 200 MORE Pokes, Peeks 'N Execs	$9.95
CoCo Memory Map	$14.95
Basic Programming Tricks Revealed.	$14.95
500 Pokes, Peeks 'N Execs	$16.95
Basic 09 Tour Guide	$19.95
Assembly Language Programming	$19.95
Color Basic Unraveled	$19.95
Extended Basic Unraveled	$19.95
Disk Basic (1.0/1.1) Unraveled	$19.95
New! CoCo II Service Manual*	$24.95
CoCo III Service Manual	$39.95
Official OS9 Manual Set	$39.95
The Complete Rainbow Guide to OS9.	$19.95
W/Two Disk Package of demo pgms	$49.95
Color/Extended/Disk Basic Unraveled - Complete disassembly of the CoCo ROMS! Complete 3 Book Set - Save $10!	$49.95

MORE GOOD STUFF...

CoCo Light Pen - ~~$24.95~~ Save $5!	$19.95
Computize "Y" Box - More positive connections than a "Y" Cable	$29.95
PBJ WORDPAK-RS - Newest version ! HiRes 80x24 display. Comes w/OS-9 drivr	$99.95
Micro Works DS-69A Digitizer	$149.95
CoCo III 512K Upgrade	COMING SOON

* - Specify CoCo II Catalogue Number

All orders plus $3.00 S/H (Foreign $5.00)
COD add $2.00 extra
NYS Residents add Sales Tax

COCO CABLES AND...

Printer/Modem 15' Extender Cable	$14.95
Tired of unplugging devices from your RS232 port? Try a RS232 "Y" Cable.	$19.95
Disk Drive Cable (34pin - 34pin)	$19.95
Modem Cable - 6ft (DB25-DB25)	$19.95
Joystick/Mouse 10' Ext Cable	$19.95
Dual Disk Drive Cable (3-34pin)	$24.95
Null Modem Cable - 4 pin to DB25	$24.95
15" Multi-Pak/Rom Pak Extender - Move your Multi/ROM Paks further away	$27.95
40 Pin Dual "Y" Cable - Hook up a Disk w/Voice, Word Pak, CoCo Max, etc	$29.95
Triple RS232 Switcher - Now select one of any three RS232 peripherals	$39.95
40 Pin Triple "Y" Cable - Hook up any 3- Voice/Word/RS232/Digitizer PAKs	$39.95
Special! 4 Drive Disk Cable	$49.95

OTHER GOOD STUFF...

C-10 tapes in any quantity	49 cents
5 1/4" Diskettes, any quantity	.79 cents
OS-9 Quick Reference Guide	$3.95
Rompak w/Blank PC Brd-27xx series	$9.95
Video Clear - This cable will reduce TV interference created by CoCo!	$19.95
The Magic Box - Load Mod I/III Basic program tapes into the CoCo	$24.95
DOS Switcher - Select from any two DOSs (Disk 1.0 1.1, JDOS) in J&M ctlr	$24.95
Orig CoCoI "D" Rev motherboard. Includes all chips (SAM, CPU, PIA's, VDG) except RAM and Ext Basic ! Spare Parts !	$29.95
256K RAM Chips (Set of 8)	$39.95
Model 100 8K Upgrade	$39.95
HJL-57 Keyboard - Save $7.00!!!	$72.95
----- Specify Model/Revision Board -----	
HDS Controller w/1.1 ROM	$79.95
Amdek Twin 3" Drive System	$139.95
Amdek Drive System w/controller	$239.95

SPECTRUM PROJECTS
PO BOX 264
HOWARD BEACH NY 11414

COD ORDER HOT LINE
718-835-1344

SPECIAL 64K RAM CHIPS $19.95

⊕⊕⊕ COLORFUL UTILITIES ⊕⊕⊕

COCO CHECKER*

Something possibly wrong with your CoCo??? CoCo CHECKER is the answer!! Will test your ROMs, RAMs, Disk Drives & Controller, Printer, Keyboard, Cassette, Joysticks, Sound, PIAs, VDG, Internal Clock Speed, Multi-Pak Interface and more!! 16K TAPE/DISK **$19.95** (see Jan '85 Rainbow Review)

MULTI-PAK CRAK

Save ROMPAKs to your 64K Disk system using the RS Multi-Pak Interface. Eliminate constant plugging in of ROMPAKs now by keeping all your PAK software on disk. Includes POKEs for "PROBLEM" ROMPAKs- including the NEW 16K PAKS! (Demon Attack,Dragons Lair,etc) 64K DISK **$24.95**

NEW!

TELEPATCH II

All the FEATURES of TELEPATCH plus the classically proportioned characters of the WIZARD ($19.95) font w/TRUE lowercase descenders! Get BOTH & SUPERCHARGE your TW-64 for only **$29.95**

SPIT 'N IMAGE

A super upgrade from Disk Omni Clone! Back everything up! This amazing program handles "non standard" disks with ease. We haven't found any disk yet that it can't handle. Don't ever be caught without a backup again! Lowest price too! Beats most "copy protection" programs! 32K DISK **$29.95**

COCO SCREEN DUMP

The best screen dump program for the Panasonic, Epson & Gemini printers ever! Have the option of standard or reverse images w/regular or double sized proportional pictures. 600-9600 Baud too! A must for Graphicom and CoCo Calendar users. 16K TAPE/DISK **$19.95** (see Nov '84 Rainbow Review)

DISK UTILITY 2.1*

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename and kill file entries. Lightning fast Disk I/O for format, copy and backup. Examine contents of files, the Granule Table, plus the size, load addresses and entry points of all programs. Single command execution of both Basic and ML programs. 32K/64K DISK **$24.95** "Disk Utility has proven itself very quickly at my house" - Ed Ellers Oct '84 Rainbow Review pg. 220

SPECTRUM FONT GENERATOR

Now you can write files using any CoCo Word Processor (Telewriter-64, VIP Writer, etc.) and convert them to special Highly Detailed character sets! Some of the character sets supported are Italics, Old English, Futuristic and Block. A character set editor is included to create custom sets or modify existing ones! Supports most dot-matrix printers! DISK **$29.95** (see Dec '85 Rainbow Review)

SPECTRUM DOS

Add 24 NEW Disk commands with 2 Hi-Res screens! Supports 40 track & Double-Sided drives, 6 ms stepping, auto disk search, error trapping & "EPROMABLE". 64K DISK ~~$49.95~~ New LOW price!! **$24.95**

SCHEMATIC DRAFTING PROCESSOR

Save time and design pro looking diagrams using a 480X540 pixel worksheet w/6 viewing windows. Over 30 electronic symbols w/10 definable symbols. (Even Logic gates & Multipin chips!) Print hard copy and save to disk. 64K DISK ~~$49.95~~ New LOW price!!! **$29.95** (see Jan '84 Rainbow Review)

NEW!

THE MEMORY MANAGER

Now you can use the SECOND 32K memory bank of your 64K CoCo as a SUPERFAST Ramdisk! Also CHAIN a long Basic program from the first bank into the second or LOAD Basic programs into both 32K banks and RUN from either bank! USER FRIENDLY & completely MENU DRIVEN. 64K DISK **$29.95**

COCO CHECKBOOK

Use your CoCo to keep track of your checking and savings accounts! Printout individual personal checks! 32K/64K TAPE **$19.95** DISK **$29.95** (see April'85 pg. 210 & Oct'85 pg. 197 Rainbow Reviews)

NEW!

THE ULTIMATE GRAPHIC ADVENTURE

Wizard's Castle is a graphic adventure game with deadly creatures, magic spells and traps of all types which are RANDOMIZED at the beginning of each session so that no 2 adventures will be the same! REAL TIME ACTION keeps the game's characters interacting even though you may be waiting to make a move. Includes three skill levels, 60 Hi-Res screens & Game Save Feature. 64K DISK **$24.95**

BUY ANY 5 PROGRAMS
GET A DOUBLE SIDED
DRIVE 0 FOR $199.95
NO OTHER DISCOUNTS CAN BE APPLIED

*NOW AVAILABLE BY EXPRESS ORDER AT
YOUR LOCAL RADIO SHACK STORE!!!
ASK TO SEE THE RADIO SHACK
DEMO DISKS - FC#0249 & FC#0919!!!

⌖⌖⌖ COLORFUL UTILITIES ⌖⌖⌖

NEW!

GREETING CARD DESIGNER

Create custom greetings for any occasion: Birthdays, Anniversaries, Holidays, etc. The program can be used to make custom Thank-You, Invitations, Get-Well cards and Announcements! Easy to use and includes a library of pre-drawn Hi-Res graphics. Includes a screen & font editor. 32K DISK **$24.95**

COCO VIDEO TITLER

Start your VCR tapes with dazzling title frames followed by professional countdown to black fade-outs! Use a title page editor with several sizes of text & background colors! 32K TAPE **$19.95**

PENPAL

It's here! CoCo's answer to 1-2-3! PENPAL combines Word Processing, Communications, Graphics, Data Base & Spread-sheet into a single integrated software package! 64K DISK INTRO PRICE **$69.95**

64K DISK UTILITY PACKAGE

Take advantage of an expanded 64K machine. Make an additional 8K of RAM available by relocating the Ext Basic ROM from $8000 to $D800. Copy ROMPAKS to disk (even "protected" PAKS) and create a 32K SPOOL buffer for printing. DISK **$24.95** (see July '83 Rainbow Review)

TAPE/DISK UTILITY

A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK **$24.95** (see Sept '83 Rainbow Review)

NEW!

SUPER DUPER UTILITIES

Finally! At last! A "SUPER DUPER" utility software package all rolled up into ONE!!! Includes such great utilities as: CoCo Disk Zap, Disk Encryption, Disk Mailing List, EZ Disk Master, Graphics ZOOM, Banner Creator, Function KEYS, Super INPUT/LINEINPUT, Basic Program PACKER, Alpha Directory, Basic SEARCH and much, much more!!! 32K DISK **$29.95** (see June '86 Rainbow Review)

COCO CALENDAR

Get organized for '86 TODAY with the CoCo Calendar! Designed for recording the entire year's occassions and daily appointments so you can plan ahead. You can store HUNDREDS of entries and our GRAPHIC Calendar will show all MEMOS! 32K DISK **$19.95** (see Mar '86 Rainbow Review)

THE OS-9 SOLUTION

NOW, a program that creates a "USER FRIENDLY" environment within OS-9! The OS-9 SOLUTION replaces 19 of the old "USER HOSTILE" commands with single keystroke, menu driven commands. No more typing in complex long pathnames or remembering complicated syntaxes! Set all XMODE parameters at the touch of keys! ~~$39.95~~ New LOW price!!! **$24.95** (see Sept '85 Rainbow Review)

COCO-UTIL

Now you can have the power to easily transfer Radio Shack Color Computer disk files to your MS-DOS machine - including the Tandy 1000 & IBM PC!!! You can also transfer MS-DOS files to your CoCo disk, even format CoCo disks! CoCo-Util will save you countless hours of retyping! No need to move your computer or printer anymore! Requires 128K MS-DOS computer w/2 disk drives - **$29.95**

NEW!

➤➤ SOFTWARE BONANZA PACKAGE ◀◀

Create an instant library of Spectrum Projects TOP Colorful Utility software. Select any of the following 12 programs to customize your own SPECTACULAR SOFTWARE BONANZA! CoCo Checker, Multi-Pak Crak, CoCo Screen Dump, Disk Utility 2.1, Spectrum Font Generator, Tape/Disk Utility, Fast Dupe II, 64K Disk Utility, Spectrum DOS, CoCo Calendar, Schematic Drafting Processor, OS-9 Solution, Graphicom, EZ Base or Blackjack Royale (a $300 plus value) for only **$99.95**!!!

FRANK HOGG'S O-PAK

A Hi-Res Screen & Utilities package for OS-9 users! Use one of the available Hi-Res character sets (42X24, 64X19, 85X24, etc.) or create your own. Mix graphics with text on a screen with unlimited flexibility. Copy files between OS-9 and Radio Shack DOS. 64K DISK **$39.95**

All orders plus $3 S/H (Foreign $5)
COD add $2 extra
NYS Residents add Sales Tax
COD ORDER LINE 718-835-1344

SPECTRUM PROJECTS INC
PO BOX 264
HOWARD BEACH NY 11414

```
25 CIRCLE(128,96),45,1,2
30 CIRCLE(128,96),30,1,3
35 CIRCLE(128,96),58,1,1.6
40 CIRCLE(128,96),80,1,1.1
45 CIRCLE(128,96),10,1,9
50 ' EYES-NOSE
55 DRAW"C8;BM68,68E16F16L32"
60 PAINT(84,64),0,8
65 DRAW"C8;BM156,68E16F16L32"
70 PAINT(172,64),8,8
75 DRAW"C8;BM112,92E16F16L32"
80 PAINT(128,88),8,8
85 ' COPY BODY, EYES AND MOUTH T
O PAGES 5 TO 8
90 PCOPY1TO5:PCOPY2TO6:PCOPY3TO7
:PCOPY4TO8
95 ' CLOSED MOUTH
100 CIRCLE(128,96),52,8,1,0,.5
105 CIRCLE(128,59),77,8,1,.160,.
35
110 PAINT(128,142),8,8
115 DRAW"C7;BM92,122D8R8U5"
120 PAINT(96,126),7,7
125 DRAW"C3;BM124,6U4R8D4L8"
130 PAINT(128,4),3,3
135 DRAW"C7;BM165,120D10L8U7"
140 PAINT(161,128),7,7
145 DRAW"C7;BM120,148U8R16D9L16U
1"
150 PAINT(128,144),7,7
155 PMODE3,5
160 ' OPEN MOUTH
161 ' LINES 165-215 ARE IDENTICA
L TO HOOPER'S LINES 90-135
165 CIRCLE(128,96),52,8,1,0,.5
170 CIRCLE(128,21),91,8,1,.160,.
35
175 PAINT(126,124),8,8
180 DRAW"C7;BM88,100D8R8U5"
185 PAINT(92,104),7,7
190 DRAW"C3;BM124,6U4R8D4L8"
195 PAINT(128,4),3,3
200 DRAW"C7;BM164,100D10L8U7"
205 PAINT(160,104),7,7
210 DRAW"C7;BM120,148U8R16D9L16U
1"
215 PAINT(128,144),7,7
220 AUDIOON
225 ' DISPLAY CLOSED-MOUTHED PUM
PKIN
230 PMODE4,1:SCREEN1,1
235 FORX=1TO50:NEXT
240 ' OPEN MOUTH IF JOYSTICK BUT
TON PRESSED
245 IF PEEK(339)=255THEN245
250 PMODE4,5:SCREEN1,1
255 FORX=1TO100:NEXT
260 GOTO230
```

Colors of the Spectrum

By Bill Bernico

You've probably seen ROY G. BIV mentioned before i THE RAINBOW. For those of you who do not know, RO G. BIV represents the six primary and secondary colors o the spectrum that make up a rainbow: Red, Orange, Yellow Green, Blue, Indigo and Violet.

The following program demonstrates the combining o any two of the primary colors (red, yellow, blue) to mak a secondary color (green, orange, violet). Just answer th computer's prompts.

16K ECB

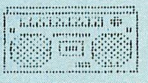
The listing: SPECTRUM

```
10 'SPECTRUM
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
60 'IDEA BY DAVID POLONSKY
70 '
80 R$=CHR$(191):Y$=CHR$(159):B$=
CHR$(175):BL$=CHR$(128)
90 CLS0:PRINT@71,"RED";:PRINT@76
,"YELLOW";:PRINT@84,"BLUE";
100 PRINT@102,STRING$(5,191);STR
ING$(8,159);STRING$(6,175);
110 PRINT@165,"CHOOSE ANY two OF
 THESE";:PRINT@197,"COLORS TO SE
E WHAT COLOR";:PRINT@229,"THEY M
AKE WHEN COMBINED.";
120 PRINT@323,"CHOICE 1 (R,Y,B):
";:INPUT C$(1):SOUND191,1
130 PRINT@387,"CHOICE 2 (R,Y,B):
";:INPUT C$(2):SOUND150,1
140 IF C$(1)=C$(2)THEN 90
150 IF C$(1)="R"AND C$(2)="B"THE
N C$(3)=CHR$(239):GOTO210
160 IF C$(1)="R"AND C$(2)="Y"THE
N C$(3)=CHR$(255):GOTO210
170 IF C$(1)="Y"AND C$(2)="R"THE
N C$(3)=CHR$(255):GOTO210
180 IF C$(1)="Y"AND C$(2)="B"THE
N C$(3)=CHR$(143):GOTO210
190 IF C$(1)="B"AND C$(2)="R"THE
N C$(3)=CHR$(239):GOTO210
200 IF C$(1)="B"AND C$(2)="Y"THE
N C$(3)=CHR$(143):GOTO210
210 PRINT@344,BL$+BL$+BL$+C$(3)+
C$(3)+C$(3)+C$(3)+C$(3);:PRINT@3
```

```
77,"="+BL$+C$(3)+C$(3)+C$(3)+C$(
3)+C$(3);:PRINT@408,BL$+BL$+BL$+
C$(3)+C$(3)+C$(3)+C$(3)+C$(3);
220 GOSUB 230:GOTO 90
230 PRINT@484,"HIT ANY KEY TO CO
NTINUE";:EXEC44539:RETURN
```

The Boogie Box

By Michael Berenz



This program prints a very small version of a jam box n any Radio Shack dot-matrix printer.

The listing: `RADIO` **4K**

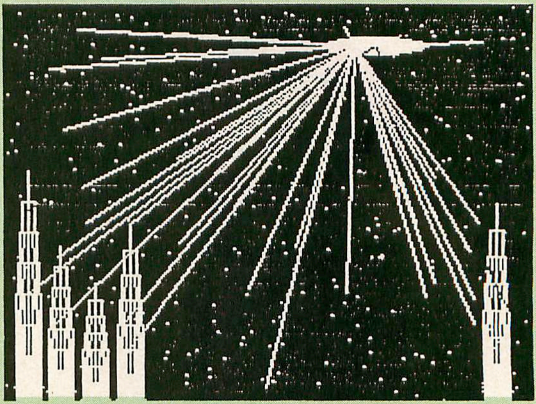
```
10 REM ******************
20 REM *      RADIO     *
25 REM * BY MIKE BERENZ *
30 REM ******************
40 PRINT#-2,CHR$(18)
50 PRINT#-2,CHR$(128);CHR$(224);
CHR$(184);
60 FOR A=1 TO 38
70 PRINT#-2,CHR$(168);
80 NEXT A
90 PRINT#-2,CHR$(184);CHR$(224)
100 READ B:IF B=999 THEN PRINT#-
2,"":GOTO 130
110 PRINT#-2,CHR$(128+B);
120 GOTO 100
130 PRINT#-2,CHR$(128);CHR$(255)
;CHR$(128);CHR$(252);
140 FOR C=1 TO 5
150 PRINT#-2,CHR$(170);CHR$(213)
;
160 NEXT C
170 READ D:IF D=999 THEN 200
180 PRINT#-2,CHR$(128+D);
190 GOTO 170
200 FOR E=1 TO 5
210 PRINT#-2,CHR$(170);CHR$(213)
;
220 NEXT E
230 PRINT#-2,CHR$(170);CHR$(252)
;CHR$(128);CHR$(255)
240 READ F:IF F=999 THEN PRINT#-
2,CHR$(30):END
250 PRINT#-2,CHR$(F+128);
260 GOTO 240
270 DATA 0,127,0,48,48,0,79,77,7
3,79,73,77,75,13,9,15,73,77,75,7
7,73,79,73,77,75,77,73,79,9,13,1
1,79,64,64,70,79,79,70,0,48,48,0
,127,999
280 DATA 42,124,1,1,125,5,53,53,
53,53,5,125,1,1,124,999
290 DATA 0,127,64,67,69,74,85,90
,85,90,85,90,85,74,69,67,64,64,6
5,65,65,65,65,89,89,89,88,88,67,
69,74,85,90,85,90,85,90,85,74,69
,67,64,127,999
```

Space Attack

By Patrick J. Benway

This short program uses the BASIC commands of `CIRCLE`, `LINE` and `PSET-PRESET` to demonstrate a space city raid.

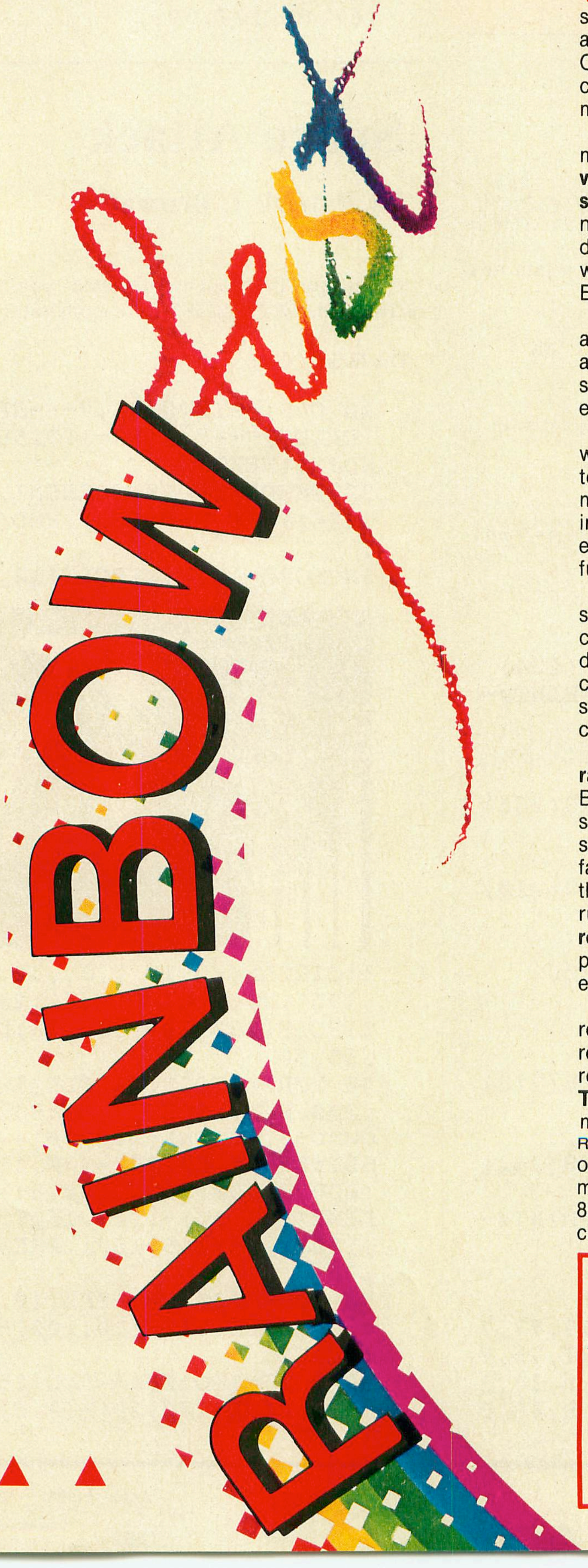
The listing: `RAID` **16K ECB**



```
10 CLS:PRINT@196,"---SPACE-CITY
(RAID!)---":FORJ=1TO255STEP3:SOU
NDJ,1:NEXT
20 PMODE4:PCLS:SCREEN1,1:FORJ=1T
O300:PSET(RND(255),RND(191)):NEX
T
30 FORJ=1TO7:CIRCLE(12,185),J,,1
5:CIRCLE(28,187),J,,10:CIRCLE(45
,195),J,,8:CIRCLE(62,225),J,,12:
CIRCLE(238,187),J,,13:NEXT:SOUND
255,50
40 FORJ=1TO25:CIRCLE(180,20),J,,
.200:NEXT:SOUND1,50:SOUND150,8:S
OUND50,1:LINE(180,20)-(30,120),P
SET:LINE(180,20)-(30,120),PRESET
:SOUND1,50:SOUND150,8:SOUND50,1:
LINE(180,20)-(245,150),PSET:LINE
(180,20)-(245,150),PRESET:SOUND1
,50
50 SOUND200,20:LINE(10,100)-(170
,20),PSET:LINE(10,100)-(170,20),
PRESET
60 FORJ=1TO100:A=RND(255):B=RND(
191):LINE(170,20)-(A,B),PSET:NEX
T
```

Princeton

Oct. 17-19



RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer. Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's the next best thing to receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Princeton is the show** to get the jump on new capabilities for the new CoCo 3. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

To make it easier for you to participate, we schedule RAINBOWfests in different parts of the country. If you missed the fun in Chicago, why don't you make plans now to join us in Princeton? For members of the family who don't share your affinity for CoCo, RAINBOWfest is located in an area with many other attractions.

The Hyatt Regency Princeton offers special rates ($79, single or double room) for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. **A special Saturday evening round table** examining the new CoCo 3 (6:30 p.m.) is sure to be a highlight. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get your special room rate.

The POSH way to go. Have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

Show Schedule:

Friday evening
- Exhibits open from 7 p.m. to 10 p.m.

Saturday
- CoCo Community Breakfast at 8 a.m.
- Exhibits open at 10 a.m. and close at 6 p.m.
- Special round table at 6:30 p.m.

Sunday
- Exhibits open from 11 a.m. to 4 p.m.

Free Seminars

Mark Siegel
Product Manager, Software Engineering, Tandy/Radio Shack
An Insider's View of the New CoCo 3

Jim Reed
RAINBOW Managing Editor
Writing for Publication

Jeffrey Parker
Independent Programmer and Author
Getting Your CoCo To Talk To Your MS-DOS

Fred Scerbo
RAINBOW Contributing Editor
Using Computers in Education

Bill Barden
Independent Programmer and Author
Beginning Assembly Language

Brian Lantz
President, National OS-9 Users Group
OS-9 Overview

George Dorner
OS-9 Veteran Programmer
The OS-9 Environment: Tools and Pipes

Dan Downard
RAINBOW Technical Editor
A Look at Peripherals

Dale Puckett
RAINBOW Contributing Editor
Beginners' Guide To OS-9 and BASIC09

Leonard Hyre
Freelance Author and Programmer
Introduction to BASIC

Cray Augsburg
RAINBOW Technical Assistant
Intro to our Delphi CoCo SIG

Bruce Warner
MOTD Editor
OS-9 From a User's Standpoint

Steve Bjork
President of SRB Software
Getting the Most from Your CoCo 3

John Gibney
Delphi National Sales Director
National Information Services vs. Local Bulletin Boards

Bill Turner
Vice President National OS-9 Users Group
Business Applications of OS-9

Paul Hoffman
Graphic Artist and Programmer
Inside CoCo Graphics

CoCo Community Breakfast

Greg Zumwalt — CoCo 3 Programmer

Our keynote speaker for the traditional CoCo Community Breakfast is Greg Zumwalt, one of the early CoCo specialists who has created everything from flight simulators to computer games. An independent programmer and computer designer, Greg is one of the select few writing Tandy software for the new Color Computer 3. He owns ZCT Software, of Tulsa, Okla., and also writes software for business applications in such areas as aviation, the oil industry and the medical field.

▲ SPECIAL EVENT!

Saturday Evening Round-Table Discussion at 6:30 p.m.

The Design, Development and Marketing of the Color Computer 3

Exclusive: Listen to the key people in the design and development of the Color Computer 3! Featured Speakers: **Barry Thompson**, Buyer, Computer Merchandising, Tandy/Radio Shack; **Mark Siegel**, Product Manager, Software Engineering, Tandy/Radio Shack; **Steve Bjork**, President, SRB Software; and **Greg Zumwalt**, President, ZCT Software.

RAINBOWfest - Princeton, New Jersey
Dates: Oct. 17-19, 1986
Hotel: Hyatt Regency Princeton
Rooms: $79 per night, single or double
Advance Ticket Deadline: Oct. 10, 1986

Join us at a future RAINBOWfest!

RAINBOWfest - Chicago, Illinois
Dates: Early April 1987
Hotel: Hyatt Regency Woodfield
Rooms: $60 per night, single or double
Advance Ticket Deadline: March 25, 1987

FREE T-Shirt to first five ticket orders received from each state.

YES, I'm coming to **Princeton!** I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

____ Three-day tickets at $9 each total ______

____ One-day tickets at $7 each total ______

Circle one: Friday Saturday Sunday

____ Saturday CoCo Breakfast at $12 each total ______

Handling Charge $1 $1.00

TOTAL ENCLOSED ______

(U.S. Currency Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency Princeton ($79, single or double room).

Name (please print) ____________________

Address ____________________

City ____________________ State ________

Telephone ____________________ ZIP ________

Company ____________________

☐ Payment Enclosed, or Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ____________________

Exp. Date ____________________

Signature ____________________

Advance ticket deadline: Oct. 10,1986. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

Get better graphics while using less memory

Optimum Animation

By Steven R. Polsz

Have you ever designed a program using animation graphics only to find, after long hours of work, that the graphics were too elaborate and they ate up so much memory there wasn't enough room for the entire program? Have you had to settle for spaceships that look like little crosses rather than the beautiful graphics display you wanted? Perhaps your explosions had to be a series of blinking colors instead of the real thing? If you have tried any extensive animation or game design, this or some similar difficulty has probably clouded your efforts. But there is a solution to this problem — a solution that frees at least 95 percent of the memory previously reserved for graphics storage.

Let us first consider the process of creating the animation scenes: the `GET` statement. The usual syntax of this statement is `GET (X1,Y1)-(X2,Y2),A` where X1,Y1 are the upper-left corner coordinates and X2,Y2 are the lower-right corner coordinates of the graphics scene to be stored. The variable 'A' is the target array where the scene is stored. This array is dimensioned to match graphics scene point to array member, in a one-to-one correspondence.

Thus, the number of members in the target array is the same as the number of points in the animation scene. If we create two animation scenes that are 8 by 16 points in size, we need two 8-by-16 arrays to store them. Each of these arrays contains 128 members, and each array member consists of five bytes — a total of 1280 bytes. This is slightly less than 300 bytes short of one graphics page.

Yet if we use `PMODE 0`, the entire graphics screen (128 by 96 points) is stored on this very same page. By using the `GET` statement, the equivalent of two rows of the video screen is stored in the identical space utilized by the computer to store the entire screen. It seems that the `GET` statement is very inefficient. Then again, is it?

Our next step is to examine the actual contents of the array 'A' after the

Steve Polsz lives in Philadelphia and is a free-lance programmer, writer and artist. The discovery of optimum animation is due to his impatient 3-year-old, Adam, and an undiscovered typo.

graphics scene has been stored in it. The following short program does just that:

```
10 PMODE1,1:SCREEN1,0:COLOR
4,3:P CLS
30 DRAW"S8 C1 BM 2,6 UER3F
2DRUHR 2ER3FD BM4,4 C4 R3FBR3ER3"
50 DIM A(15,5):GET(0,0)-(30,10),
A:PUT(32,32)-(62,42),A
70 GOSUB210
90 FORJ=0TO5
110 FORI=0TO15
130 PRINTI;J;A(I,J)
150 NEXTI
170 GOSUB210
190 NEXTJ
210 A$=""
230 A$=INKEY$
250 IFA$="" THEN 230 ELSE RETURN
```

Lines 10 through 50 create the spaceship graphics scene shown in the Figure, then reproduces it elsewhere on the screen by use of the PUT statement. This scene is 16 by six, therefore the associated array consists of 480 bytes — slightly more than one-fourth of one graphics page.

By pressing any key, the contents of the array 'A' are displayed, one screenful at a time. To view the next screenful, push any key.

The first two numbers are the indices of the array member, the third, its value. As you can see, the great majority of these values is zero. The non-zero members are as follows:

A(0,0)	-2.932031 E+12
A(1,0)	-1.88127596 E-36
A(2,0)	-9.12340439 E-35
A(3,0)	-1.14532461 E+10
A(4,0)	-2.93203083 E+12

How should we interpret this? The first five members of 'A' are non-zero and distinct, while the remaining cells of 'A' are empty.

According to the Extended BASIC manual, the GET statement transfers the animation scene pointwise in a one-to-one mapping into the array 'A'. Therefore, we should expect, for example, the point (0,0) to be coded into A(0,0), the point (2,0) into A(1,0), and so forth until point (30,10) is mapped into A(15,5). Obviously this cannot be the case. If it were, A(0,0) through A(4,0) would be identical and none of the members of 'A' would have a zero value.

The logical assumption is that the entire graphics scene is coded into the first five members of 'A'. Let us add the following lines to our program:

```
60 DIM B(4): GET(0,0)-(30,10),
B: PUT(64,32)-(94,42),B
```

Replace lines 90 through 130 with:

```
90 FOR I= 0 TO 4
110 PRINT A(I,0); B(I)
```

Delete Line 190 and run the program.

The original spaceship appears in the upper-left corner along with two duplicates. Examine the two closely; you will find them to be identical. Push any key and the screen displays the values of A(0,0) through A(4,0) with its counterpart from the array 'B' next to it. As you see, these too are identical.

So the two-dimensional array supposedly required for the GET/PUT statement pair can be replaced by a one-dimensional array of considerably shorter length. But how can we determine the minimum size of this array?

This answer may be deduced from the information found in the BASIC manual *Getting Started with Color BASIC*. Pages 264 to 266 detail the computer's method of storing graphics information (see Table 1).

Table 1

Graphics 2R is the same as PMODE 0
Graphics 3C is the same as PMODE 1
Graphics 3R is the same as PMODE 2
Graphics 6C is the same as PMODE 3
Graphics 6R is the same as PMODE 4

As we can see from the table, there are eight points of graphics display per byte for even-numbered PMODES, and four points per byte for odd-numbered PMODES.

Taking all this into consideration, the 96 points of the spaceship graphics in PMODE 1 can be contained in 24 bytes of information. Since each member of an array contains five bytes, this scene can be fitted into an array of length five.

The GET parameters define exactly how the scene is fitted into the target array. If either more of less than five bytes are used in any row of the graphics scene, there will be a "wrap around" so that each member of the target array will be filled before the next one is written into.

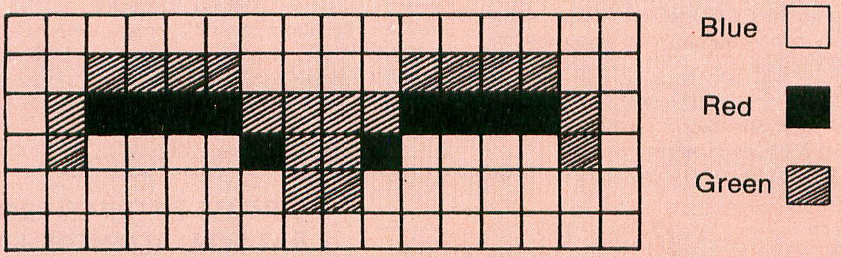
The PUT statement reverses this process, translating the scene within the confines of its parameters. Any trailing members of the information array have a zero value and are ignored.

Therefore, to most efficiently use the GET/PUT statement pair, count the number of graphics points used in the scene and divide this number by 20, if in an odd PMODE, or 40, if in an even PMODE, then subtract one.

The result is the necessary length of a one-dimensional array needed to store the scene. As you see, by use of this method, the array space is drastically reduced — a total of at least 95 percent over the usual method.

(Questions about this program may be directed to the author at 6739 Regent Street, Philadelphia, PA 19142, 215-727-7562. Please enclose an SASE when writing.)

Figure 1: Spaceship in PMODE 1



Introducing

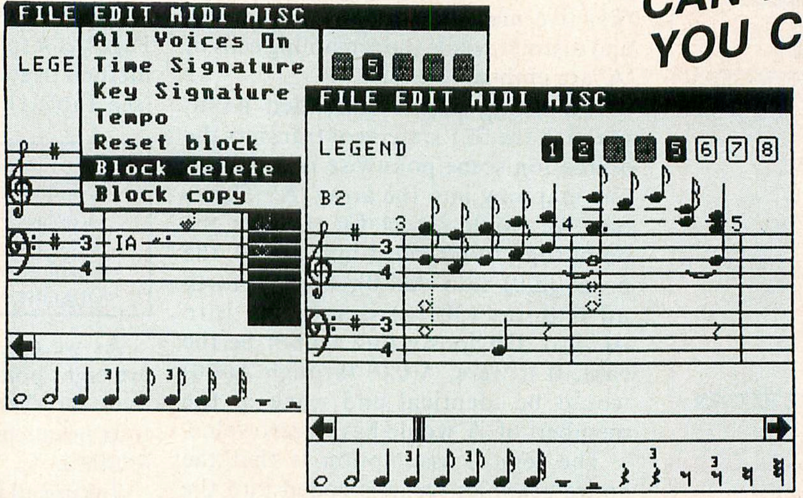
Lyra™

The Musical Coco Max™

IF YOU CAN POINT, YOU CAN COMPOSE

PULL DOWN MENUS

ICONS!



A MUST FOR MIDI USERS

LYRA is the most powerful music composition program we have seen on any computer. We don't mean just the COCO, we really mean any computer. Whether you are a novice trying to learn music or a professional musician with MIDI equipment you will find LYRA a powerful tool. You see, we wrote LYRA for musicians that hate computers. If you want proof, purchase a LYRA demo for $7.95. We will apply the demo price to your purchase. MIDI output requires the LYRA MIDI cable (#MC158) or COCO MIDI Seq/Editor (#CM147).

- ✓ Ultra Easy to use, just point with joystick or mouse and click.
- ✓ Compose with up to 8 completely independent voices.
- ✓ Room for over 18,000 notes. (This is not a misprint!)
- ✓ Super Simple Editing Supports:

Note insert	Block insert
Note delete	Block delete
Note change	Block copy

- ✓ Output music to:

TV Speaker	Monitor Speaker
STEREO PAK	ORCHESTRA 90
SYMPHONY 12	COCO MIDI S/E
MIDI Synth	MIDI Drum Machine

- ✓ Output up to 4 voices without additional hardware.
- ✓ Output all 8 voices using either SYMPHONY 12 or one or more MIDI synthesizers and drum machines.
- ✓ Output any voice on any of the 16 MIDI channels.
- ✓ Transpose music to any key.
- ✓ Modify music to any tempo.
- ✓ Automatically inserts bar for each measure as you compose.
- ✓ Key signature lets you specify sharps and flats only once, LYRA will do the rest.
- ✓ Plays MUSICA 2 files using LYRA CONVERT (#LC164).
- ✓ Each voice may be visually highlighted or erased.
- ✓ Each measure is numbered for easy reading.
- ✓ Solo capability
- ✓ Block edits are highlighted.
- ✓ Tie notes together for musical continuity.
- ✓ Name of note pointed to is constantly displayed.
- ✓ Jump to any point in the score instantaneously.
- ✓ Memory remaining clearly displayed, however you will have plenty of memory even for the most demanding piece.
- ✓ Help menu makes manual virtually unnecessary.
- ✓ LYRA is 100% software, no need for extra hardware unless you want more power.
- ✓ Music easily saved to tape or disk.
- ✓ Requires 64K and mouse or joystick.

LYRA (Disk Only) #LY122 . . . . **$54.95**

LYRA OPTIONS

These LYRA options are **not** required. They are provided for those wishing additional flexibility.

LYRA CONVERT
A program to convert MUSICA 2 files to LYRA files.
(T or D) #LC164 . . . . **$14.95**

LYRA STEREO ENHANCER
Gives the LYRA stereo output when used with the STEREO PAK or ORCHESTRA 90.
(T or D) #LS149 . . . . **$14.95**

LYRA MIDI CABLE
A cable to connect your computer to your MIDI synthesizer.
#MC158 . . . . **$14.95**

LYRA SYMPHONY 12 ENHANCER
Lets LYRA play all 8 voices through SYMPHONY 12.
(T or D) #LS177 . . . . **$19.95**

STEREO PAK
Plugs into the COCO ROM cartridge slot allowing easy connection to your stereo system.
#SP193 . . . . **$39.95**

SYMPHONY 12
A real hardware music synthesizer, lets LYRA play all 8 voices in stereo.
(T or D) #SY149 . . . . **$69.95**

COCO MID Seq/Editor
A professional quality MIDI interface for MIDI synthesizers.
(Disk only) #CM147 . . . . **$149.95**

MUSIC LIBRARY
A collection of over 800 songs. When used with CONVERT, it gives an incredible LYRA library. Each volume 100 songs.
(T or D) #MLXXX **$29.95**

COCO MAX is a trademark of Colorwave.
ORCHESTRA 90 is a trademark of Radio Shack.

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD Charge	$2.00

Illinois residents add 6¼% sales tax.

Speech Systems

38W255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880

COCO MIDI™ SEQUENCER/EDITOR

Now your COCO can talk to your MIDI music synthesizer. Whether ou have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA MIDI system that plays MUSICA files or our Professional COCO MIDI SYSTEM.

Roland
JX-3P

- Supports up to 16 tracks.
- Up to 8000 events per track.
- May be used as a sequencer.
- User friendly graphics display.
- Menu driven.
- Metronome available.
- Real time recording.
- Save your masterpiece to disk.
- Playback any or all tracks at any tempo.
- Tracks may be deleted, copied, transposed, or mixed.
- Filter out unwanted channel or type of MIDI data.
- Tempo may be modified.
- Quantitizing to 32nd or 64th.
- Simple music editing.
- Requires 64K disk system.
- Transposition.

Comes complete with Rom Pak Hardware interface, cables, manual, and software. Requires Y-Cable or Multi-Pak.
Disk only. #CM147 . . . **$149.95**

MUSICA MIDI™

MUSICA MIDI takes any MUSICA 2 music file and plays it through your MIDI synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using MUSICA 2. Includes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer.
Tape or Disk. #CM126 . . . . **$39.95**

DX-7 LIBRARIAN™

RAM cartridges for the Yamaha DX-7 aren't cheap and don't hold all the sounds you would like. The DX-7 LIBRARIAN is a program that when used with COCO MIDI, lets you save and load any number of sounds. Save sounds individually or as a group letting you load the DX-7 in seconds.
Disk only. #DX143 . . . . **$29.95**

MIDI KEYBOARD

If you own the Casio CZ-101 or similar MIDI synth, you know that the mini keys and the short 3 or 4 octave keyboard is limiting. MIDI KEYBOARD when used with our full size 5 octave keyboard gives you the flexibility you need. Comes with cable to connect the COCO to your MIDI synth.
#MK167 . . . . **$29.95**

MUSICA TO COCO MIDI

This program is for COCO MIDI users that wish to convert MUSICA files so they can be played by COCO MIDI. It opens your MIDI synths to our MUSIC LIBRARY and much public domain music.
Disk only. #MC193 . . . . **$29.95**

MUSIC LIBRARY™

The MUSIC LIBRARY series consists of 8 volumes: 100 through 800 each sold separately. Each contains over 100 four voice music selections with a playing time of over 3 hours each. The disk version is shipped on 5 full disks. When coupled with STEREO PAK, the music is reproduced with unsurpassed realism.

A JUKEBOX program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music. MUSICA 2 users may customize each song. Each volume sold separately, specify tape or disk. #MLXXX **$29.95**
List of 800 songs #LS800 . . . . **$3.00**

MUSIC LIBRARY 100

Stage, Screen, & TV
Music of the 70's
Music of the 60's
Music of the 50's
Old Time Favorites
Classical
Christmas (popular)
Christmas (traditional)
Patriotic
Polka Party

MUSIC LIBRARY 200 (another 100 selections)
MUSIC LIBRARY 300 (another 100 selections)
MUSIC LIBRARY 400 (another 100 selections)
MUSIC LIBRARY 500 (another 100 selections)
MUSIC LIBRARY 600 (another 100 selections)
MUSIC LIBRARY 700 (another 100 selections)
MUSIC LIBRARY 800 (another 100 selections)

Entire Library
30 Hours of
Music!
40 disks
or
25 tapes

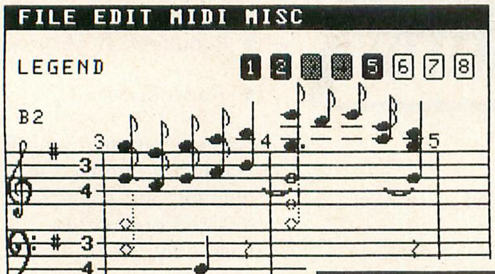
Lyra™ MEETS SYMPHONY 12™

12 SIMULTANEOUS VOICES

4 NOISE GENERATORS

STEREO & MONO

SOUND EFFECTS



musical applications of microprocessors

SPECIAL COMBINATION OFFER!

If you want to compose music, experiment, or just listen to music, LYRA is the tool you need. LYRA represents the new state-of-the-art super user friendly software. Pull down menus and icons make composing music as easy as pointing with a joystick or mouse and clicking. LYRA is capable of 8 individually controlled voices. You may take advantage of the 8 voice power of LYRA using external MIDI synthesizers or SYMPHONY 12. We believe that LYRA and SYMPHONY 12 was a match made in heaven. For a limited time, when you purchase both, we will include free the LYRA SYMPHONY 12 CONNECTION, a $19.95 value.

STEREO AND MONO. By connecting SYMPHONY 12 to your home stereo system, music is produced in stereo, 6 voices from each channel. However, you don't need to have a stereo system, all 12 voices also come out of your TV or monitor.

SOUND EFFECTS. SYMPHONY 12 is a sophisticated sound generator. 12 voices and 4 noise generators give you incredible sound effect capability. We have included gun shot, explosion, racing car and more.

SYMPHONY 12. You get over a dozen music and sound effect selections and complete documentation. Software is shipped on Tape or Disk.

PIANO KEYBOARD. For those wishing to turn SYMPHONY 12 into a real polyphonic synthesizer we offer a full size 61 note piano keyboard.

Tape users using both SYMPHONY 12 and the PIANO KEYBOARD will require a Y-CABLE. Disk systems require a Triple Y-CABLE or MULTI-PAK.

SYMPHONY 12 (T or D) #SY149	**$69.95**
LYRA SYMPHONY 12 ENHANCER #LS177	**$19.95**
PIANO KEYBOARD #PK185	**$169.95**
DOUBLE Y-CABLE #DY181	**$28.95**
TRIPLE Y-CABLE #TY173	**$34.95**

GUITAR CHORD BOOK

This program, written by a guitar instructor of 17 years, displays in high resolution graphics the exact fingering for over 100,000 chord combinations. You may even tune your guitar to the computer and play along. Whether you are a beginning guitar student or an advanced player, you will find this quick reference to guitar chords invaluable.

32K Disk only #GC153 .... **$29.95**

MUSIC THEORY

COURSE 1

This course covers all the basics from music notation & duration, key signatures, tempo, to an introduction of the keyboard. This is an entry level course recommended as a prerequisite for Course 2.

32K Disk only. #MT101 .... **$49.95**

COURSE 2

A more advanced course that deals with: Major and Harmonic Minor scales, interval spelling, Triad (Chord) theory, Inversions, Dominant 7th chords, and ear training of the intervals.

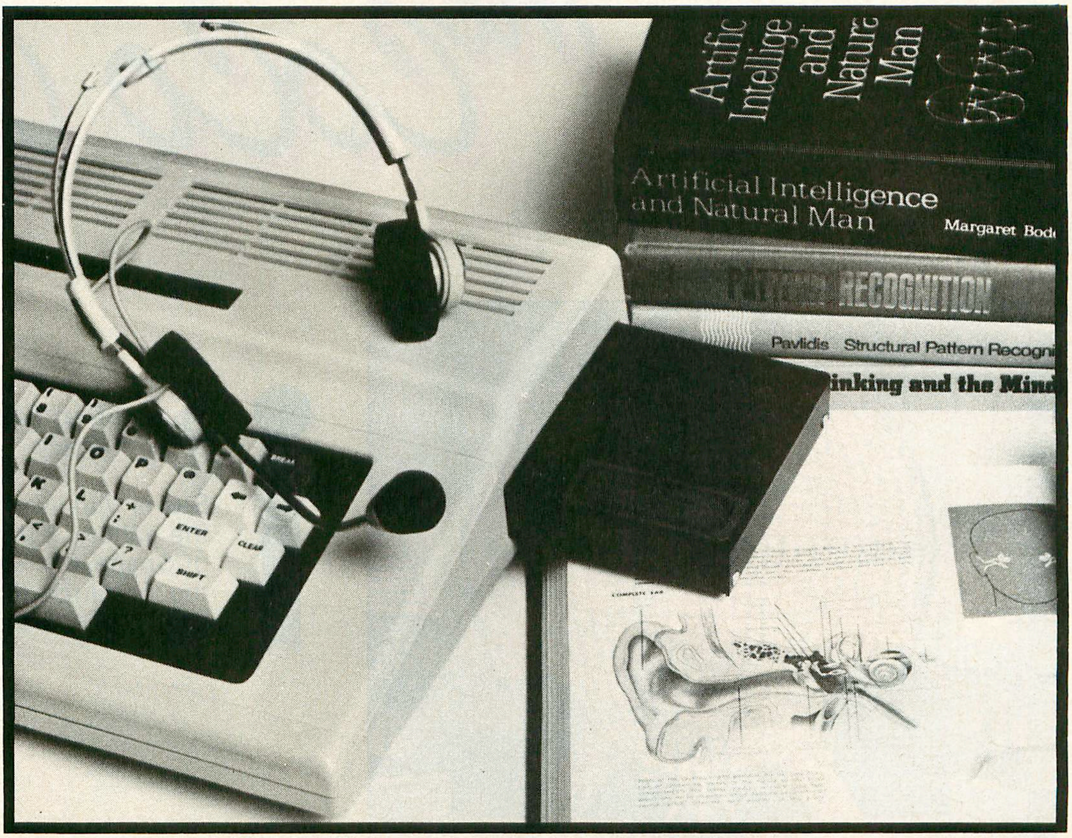
32K Disk only #MT102 .... **$49.95**

Now Your Computer Can Listen To You!

EARS™

Electronic
Audio
Recognition
System

$99.95



- SPEECH RECOGNITION
- HANDS OFF PROGRAMMING
- HIGH QUALITY SPEECH REPRODUCTION

EARS Does It All!

INCREDIBLE!

Two Years In the Making. Speech Systems was formed to develop new and innovative speech products. After 2 years of intensive Research and Development, we have created a truely sophisticated speech recognition device. Recognition rates from 95% to 98% are typical. Until now, such a product was outside the price range of the personnel computer market, and even small businesses.

EARS is trained by your voice and capable of recognizing any word or phrase. Training EARS to your particular voice print takes seconds. Up to 64 voice prints may be loaded into memory. You may then save on tape or disk as many as you like so that your total vocabulary is virtually infinite.

Speech and Sound Recognition. EARS is really a sound recognition system, so it really doesn't matter whether you speak in English, Spanish, or French. In fact you do not have to speak at all, you can train EARS to understand sounds such as a musical note or a door slamming.

Hands Off Programming. Imagine writing your own BASIC programs without ever touching the keyboard. Everything that you would normally do through a keyboard can now be done by just speaking.

Programming EARS Is Easy. LISTEN, MATCH and other commands have been added to BASIC so that programming EARS is a piece of cake! The single BASIC line: 10 LISTEN: MATCH will instruct EARS to listen to you and return the matching phrase.

It Talks. EARS is also capable of high quality speech. We mean REALLY high quality. The speech is a fixed vocabulary spoken by a professional announcer. Speech Systems is currently creating a library of thousands of high quality words and phrases. For a demonstration call **(312) 879-6844**, you won't believe your ears or our EARS.

DISK OWNERS. EARS will work with any disk system with either a MULTI-PAK or Y-CABLE. Our new Triple Y-CABLE was specifically developed for those wishing to add SUPER VOICE as a third device.

You Get Everything You Need. You get everything you need including a specially designed professional headset style noise cancelling microphone. The manual is easy to use and understand. Several demonstration examples are included so you don't have to write your own programs unless you want to. EARS will work in any 32K or 64K Color Computer.

SUPER VOICE $20 OFF

Imagine talking to your computer and it talking back to you. When you need an unlimited vocabulary, you can't beat SUPER VOICE. For a limited time, we will give you the SUPER VOICE for $59.95 with your EARS purchase. Even if you already have another speech unit, here is your chance to buy the best and save $20.

VOICE CONTROL

Applications for EARS are astounding. Here is our first of many listening programs to come. VOICE CONTROL is a program specifically designed to allow you to control any appliance in your house with your voice and our HOME COMMANDER (sold separately) or the Radio Shack Plug 'N' Power controller. For example, you can control your TV by saying "TV ON" or "TV OFF". . **$24.95**

FREE
BLANK DISK
OR TAPE
WITH EVERY
ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

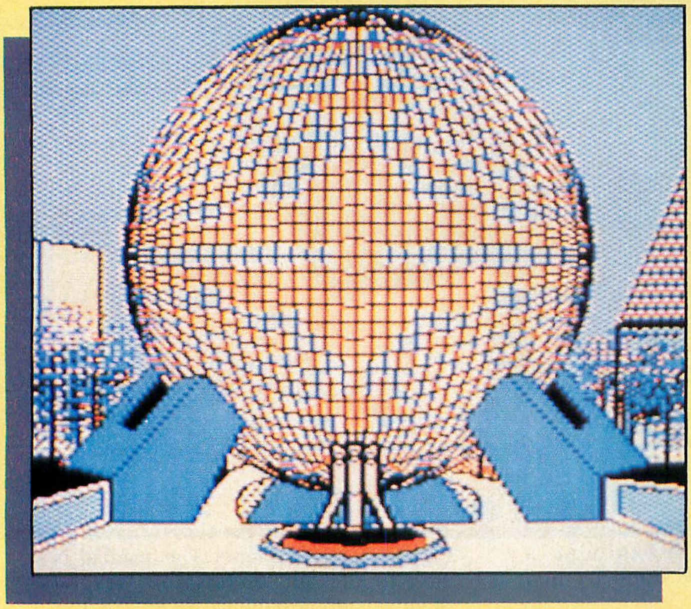
Illinois residents add 6¼% sales tax

Speech Systems

38W255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880 (TO ORDER)

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL

The CoCo Gallery



1st PRIZE

Spaceship Earth

Steve Warrick

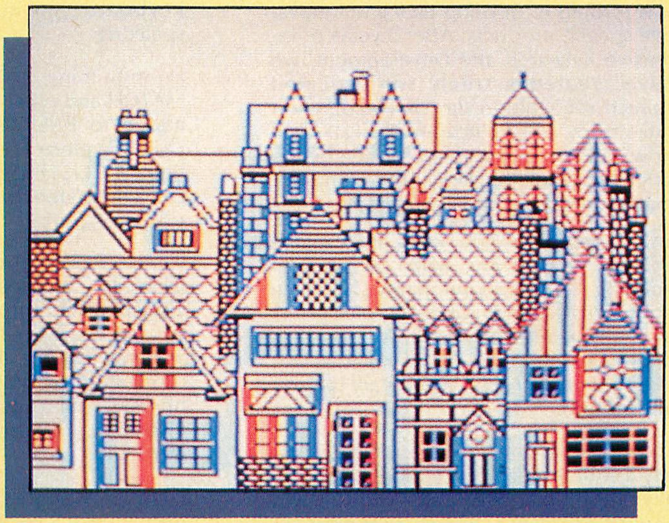
Steve, who lives in Peru, Illinois, opens the gallery with this graphic rendition of Spaceship Earth, which dominates the entrance to Epcot Center. Steve used *CoCo Max* for his work of art.

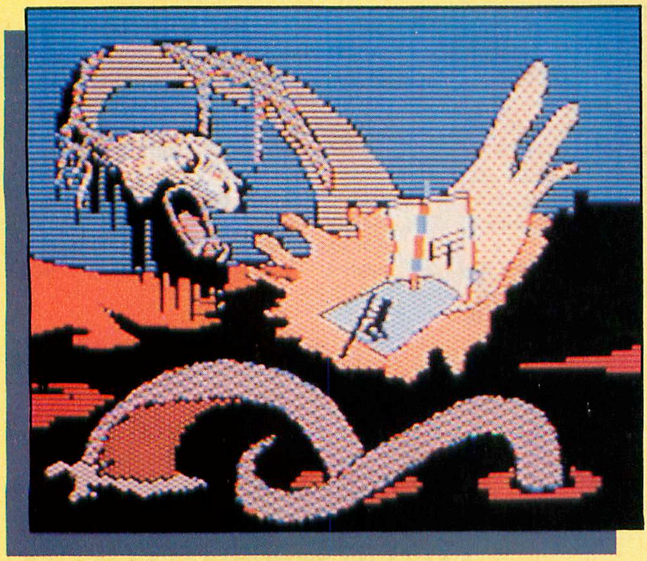
2nd PRIZE

Co Covilla

Edwin Hathaway

From his home in Glendale Heights, Illinois, Edwin created this vibrant European community with the use of *CoCo Max*.





3rd PRIZE

Serpent

Charlie Fulp

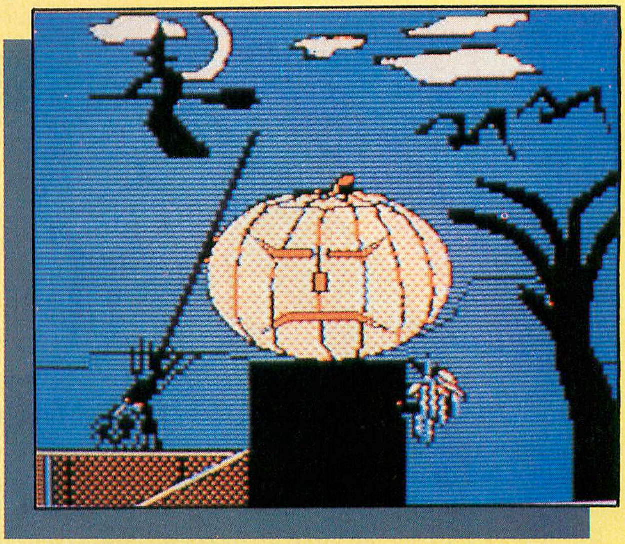
Sailing within the coils of a sea snake, Charlie, who lives in South Boston, Virginia, used *CoCo Max* to create this viperous pictorial.

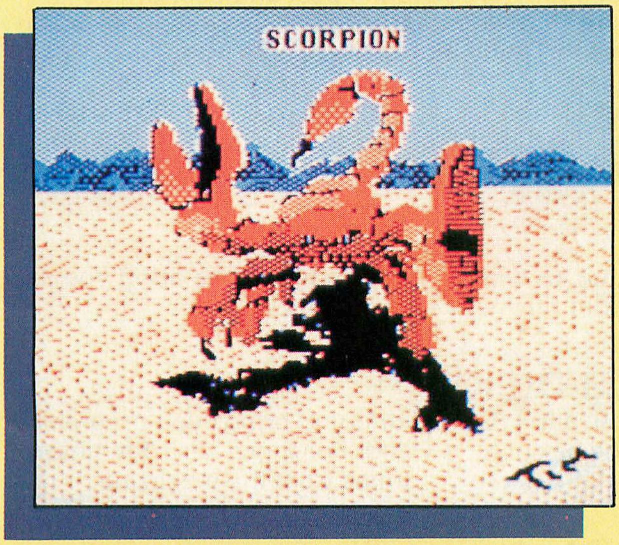
Halloween

George Aloia

HONORABLE MENTION

George, of Margate, Florida, used *CoCo Max* to bewitch the gallery with a Halloween treat.





Scorpion

Tim Cummings

HONORABLE MENTION

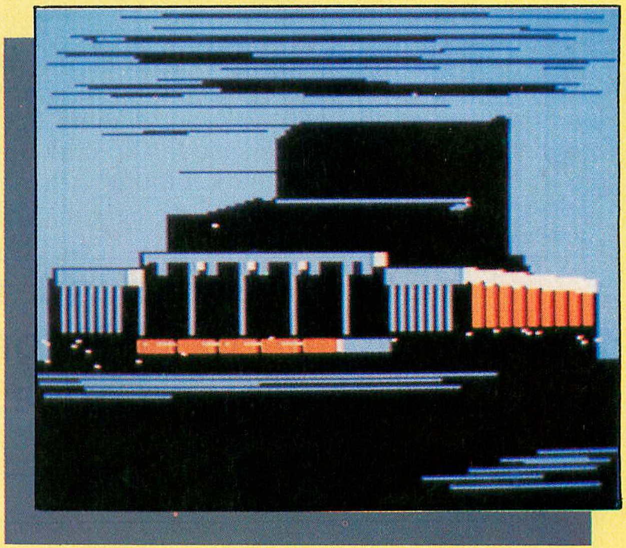
With the latter part of October being under the horoscope sign of Scorpio, Tim used *CoCo Max* to create this lethal arachnid. Tim lives in Micilani, Hawaii.

Center

John Bayko

HONORABLE MENTION

John, who lives in Regina, Saskatchewan, teaches a twelfth grade computer class and created this graphic illustration of the Saskatchewan Center of the Arts with the use of BASIC.



SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community!

Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions will also be given.

Jody Doyle, Curator

Send your entry on either tape or disk to:

CoCo Gallery
THE RAINBOW
P.O. Box 385
Prospect, KY 40059
Attn: Jody Doyle

Now from Falsoft, The RAINBOW MAKER, comes . . .

PCM

The magazine for Tandy portable and MS-DOS users

Not only does Tandy produce our favorite CoCo, we think they produce the best and best-priced laptop portable and MS-DOS computers as well. We've found that when satisfied Color Computer users decide to add portability or move to MS-DOS, many stick with Tandy. For these people we publish PCM, The Personal Computer Magazine for Tandy Computer Users.

Each month in PCM, you'll find information and programs for the Tandy 100, 102, 200 and 600 portable computers. And you'll find even more coverage for their MS-DOS machines, the 1000, 1200, 2000 and 3000, along with the great new 1000 EX, 1000 SX and 3000 HL.

FREE PROGRAMS!

We learned from THE RAINBOW that readers want programs to type in, so each month we bring you an assortment of them: games, utilities, graphics, and home and business applications.

BAR CODE LISTINGS AND PROGRAM DISKS!

For portable users, PCM is the only home computer publication in the world that brings you programs in bar code, ready to scan into memory like magic with the sweep of a wand! For those who don't have time to type in listings, we offer a companion disk service with all the programs from the magazine.

TUTORIALS AND PRODUCT REVIEWS!

As if all this weren't enough, we offer regular tutorials on telecommunications and hardware; assembly language, BASIC and PASCAL programming tips; and in-depth reviews of the new software, peripherals and services as they are released. Add it all up and we think you'll find PCM to be the most informative and fun magazine for this market today!

To order by phone (*credit card orders only*) call 800-847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

☐ YES! Please send me a one year (12 issues) subscription to PCM for only $28.* A savings of 22% off the newsstand price.

For greater convenience, order a PCM Subscription through the shopping area of the CoCo SIG of Delphi!

Name ____________________

Address ____________________

City ____________________ State __________ ZIP ______

In order to hold down costs, we do not bill.

☐ My check in the amount of __________ is enclosed.

Charge to my: ☐ VISA ☐ MasterCard ☐ American Express

Acct. # ____________________ Expiration Date ________

Signature ____________________

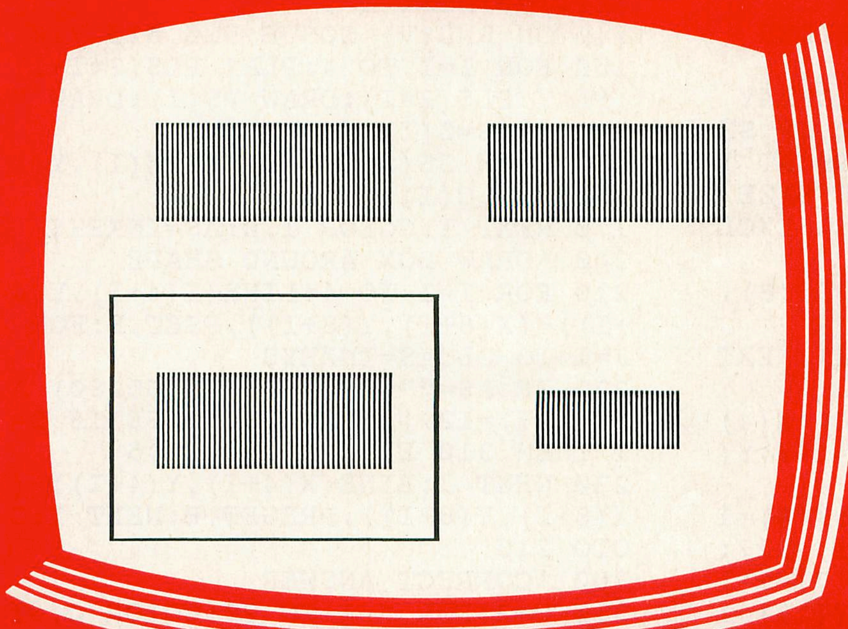
*Canadian subscribers U.S. $35. Surface rate elsewhere $64, airmail $85. Allow 6 to 8 weeks for first copy. Kentucky residents add 5% sales tax. **U.S. currency *only*, please.**

Mail to: PCM, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

The challenge in this game is to pick . . .

The Odd Man Out

By Harold Schneider



My daughter, who is almost three years old, is fascinated by the computer. Whenever she sees me or her sisters using it, she demands a chance to type at the keyboard or use the joysticks. Since this enthusiasm should certainly be encouraged, I have tried to write some games for her to play and become accustomed to using a computer.

Like most other children her age, my daughter loves to watch "Sesame Street." The game song "One of These Things Is Not Like the Others" gave me the idea for this program.

In the program *NotLike*, the child must choose which of four items is different from the other three. When the program is run, four geometric figures are drawn on the screen. Three are identical, but the fourth (which can be in any of the four corners of the screen) is different. It may be a different color, a different shape, or a different size from the others.

After the figures have been drawn and the song has been played, a box appears around the figure in the upper left corner. After a few seconds, the box moves to the next figure, and so on. The child must either press a key or joystick button (from either joystick) while the box is around the different figure.

If the child answers correctly, the box flashes through different colors and a beeping tone is played. Then the screen is erased and new figures are drawn. If the child answers incorrectly, a low note is sounded but nothing else happens. The box continues to move to the different figures and the child must try again.

The game continues until the BREAK key is pressed. There is no scoring since a score would be meaningless to the preschooler.

The program is well-commented. When it is run, arrays and variables are

---

Dr. Harold Schneider is a professor of mathematical sciences at Roosevelt University in Chicago where he teaches mathematics, computer science and actuarial science.

initialized. The PLAY strings for the song, which appear in DATA lines 1010 through 1020, are read into array PL$. The DRAW strings for the figures are read from DATA lines 1510 through 1650 into array S$. The array P$ holds the four possible starting positions for each figure. The arrays 'X' and 'Y' hold coordinates. For I = 1 to 4, these are the center PAINT positions. For I = 5 to 8, 'X' and 'Y' hold the coordinates of the upper left-hand corner, and for I = 9 to 12, they hold the coordinates of the lower right corner.

Lines 100 to 170 control the choosing and drawing of the figures. A random color (C1) and figure (S1) are chosen and the size is fixed at five. The position for the different figure (D) is selected. Still another random choice decides whether to vary the color, shape or size.

The subroutines to choose a different color, shape and size start at lines 500, 600 and 700. If size is chosen, the different figure can either be larger or smaller than the others.

Lines 200 to 230 draw the box and check whether a key or joystick button is pressed. This should work with all versions of BASIC. If a correct answer is given, the program branches to Line 300, but an incorrect answer branches to Line 350.

Several easy changes are built into the program. The variable DL, assigned to 110 in Line 20, is the delay constant. It determines how long the box remains around each figure before moving to the next one. Currently, the pause is about 3.5 seconds. You may change DL to make the delay longer or shorter.

The variable V in Line 20 determines the number of things that can vary to make one figure different. When this is three, as it is set in the program, the different figure can vary in color, shape or size from the others. If V equals two, then only color and shape may vary. This makes the program much easier, since size differences are the hardest for a child to discern. If V equals one, then only color changes can occur. Do not use any values for V other than one, two or three.

Variable NS in Line 20 is the number of different shapes available. It is eight for the original program. You can add extra shapes by putting DRAW strings for them in DATA statements at the end of the program and increasing the value of NS accordingly. Use only DRAW statements. Each figure should start from the center position and be restricted to a square of about 70 pixels on each side. Use only relative moves, not absolute coordinates of points. Your figure must be drawn so that a PAINT statement starting in the center will color the entire figure.

NotLike teaches the preschooler important skills in reasoning, color recognition and shape discrimination. In addition, it gives experience in using a computer and is fun to play. I hope your toddler enjoys playing it as much as mine does.

(You may direct questions about this program to the author at 430 S. Michigan Ave., Chicago, IL 60605, 312-747-5432. Please enclose an SASE when writing.) □

70	164
220	70
710	50
1520	184
END	72

The listing: NOTLIKE

```
0 'NOTLIKE BY HAROLD SCHNEIDER
10 PCLEAR 4:I=RND(-TIMER)
20 DL=110:NS=8:V=3:'DL IS DELAY
CONSTANT:'NS IS THE NUMBER OF SH
APES IN THE DATA STATEMENTS AT T
HE END:'SET V=2 TO EXCLUDE SIZE
DIFFERENCES AND V=1 TO ALSO EXCL
UDE SHAPE DIFFERENCES
30 DIM X(12),Y(12),P$(4),PL$(8),
C(4),Z(4),S$(NS)
40 FOR I=1 TO 8:READ PL$(I):NEXT
 I
50 X(1)=64:X(2)=192:X(3)=64:X(4)
=192:Y(1)=48:Y(2)=48:Y(3)=144:Y(
4)=144
60 X(5)=0:X(6)=128:X(7)=0:X(8)=1
28:X(9)=127:X(10)=255:X(11)=127:
X(12)=255:Y(5)=0:Y(6)=0:Y(7)=96:
Y(8)=96:Y(9)=95:Y(10)=95:Y(11)=1
91:Y(12)=191
70 P$(1)="BM64,48":P$(2)="BM192,
48":P$(3)="BM64,144":P$(4)="BM19
2,144"
80 FOR I=1 TO NS:READ S$(I):NEXT
 I
100 'DRAW SHAPES
110 PMODE 4,1:COLOR 0,1:PCLS:SCR
EEN 1,1:PMODE 3,1
120 C1=RND(3):S1=RND(NS):D=RND(4
)
130 FOR I=1 TO 4:C(I)=C1:S(I)=S1
:Z(I)=5:NEXT I
140 ON RND(V) GOSUB 510,610,710
150 FOR I=1 TO 4:PLAY PL$(2*I-1)
:PLAY PL$(2*I):DRAW P$(I):DRAW "
C=C(I);S=Z(I);"
160 DRAW S$(S(I)):PAINT(X(I),Y(I
)),C(I),C(I)
170 NEXT I:COLOR 1,0:A$=INKEY$
200 'DRAW BOX AROUND SHAPE
210 FOR I=1 TO 4:LINE(X(4+I),Y(4
+I))-(X(8+I),Y(8+I)),PSET,B:FOR
J=1 TO DL:A$=INKEY$
220 IF A$="" AND ((PEEK(65280) A
ND 127)=127) THEN 230 ELSE IF D=
I THEN 310 ELSE SOUND 20,5
230 NEXT J:LINE(X(4+I),Y(4+I))-(
X(8+I),Y(8+I)),PRESET,B:NEXT I:G
OTO 210
300 'CORRECT ANSWER
310 C=2:FOR J=1 TO 20:COLOR C,0:
LINE(X(4+I),Y(4+I))-(X(8+I),Y(8+
I)),PSET,B:C=C+1:IF C>3 THEN C=1
```

```
350 'INCORRECT ANSWER
360 SOUND 120,2:NEXT J:GOTO 110
500 'DIFFERENT COLOR
510 C2=RND(3):IF C2=C1 THEN 510
520 C(D)=C2:RETURN
600 'DIFFERENT SHAPE
610 S2=RND(NS):IF S2=S1 THEN 610
620 S(D)=S2:RETURN
700 'DIFFERENT SIZE
710 IF RND(4)>3 THEN 720 ELSE Z(
D)=3:RETURN
720 FOR I=1 TO 4:Z(I)=3:NEXT I:Z
(D)=5:RETURN
1000 'SONG
1010 DATA T3O2L8.BP64L16BP64O3L4
EP64GP64BP64,FP64L8.FP64L16GP64L
8AP64L4.FP64,O2L8.BP64L16BP64O3L
4DP64FP64BP64,L8GP64L4GP64L8FP64
L4EP64
1020 DATA L8.BP64L16BP64O2L4BP64
O3EP64GP64BP64,FP64L8.FP64L16GP6
4L8.AP64L16FP64,L8.FP64L16FP64L4
BP64BP64O2L8.BP64O3L16CP64L4DP64
EP64,P64
1500 'CIRCLE
1510 DATA "BM+0,-22L5GL3DL3DL2DL
DL2DL2G3DG2DG2DGD2GD2GD4GDFD5FD2
FD2FDFFDFDF4RFRF2RFR2FR2DR4FR2ER
4UR2ER2ERE2RERE4UEUE2UEU2EU2EU5E
UHU4HU2HU2HU2HUH2UH3L2UL2ULUL2UL
3UL3UL6"
1520 'SQUARE
1530 DATA "BM-26,-26R52D52L52U52
"
1540 'EQUILATERAL TRIANGLE
1550 DATA "BM+0,-30;M-30,+49;M+6
0,+0;M-30,-49"
1560 'WIDE RECTANGLE
1570 DATA "BM-36,-15R72D30L72U30
"
1580 'TALL TRIANGLE
1590 DATA "BM+0,-35;M+15,+60;M-3
0,+0;M+15,-60"
1600 'SHORT TRIANGLE
1610 DATA "BM+0,-10;M+36,+18;M-7
1,+0;M+35,-18"
1620 'HEXAGON
1630 DATA "BM+16,-20L28GDG2G2DDG
2DG2DG2DG2DG2DG2F2DF2DF2DF2DF2DF
2DF2DF2DR29UE2UE2UE2UE2UE2UE2UE2
UE2H2UH2UH2UH2UH2UH2UH2U2H2U"
1640 'TALL RECTANGLE
1650 DATA "BM-14,-33R28D66L28U66
"
```

SPECIAL DEAL ON 500 PROGRAMS!

GET 50 DISKS OR 50 CASSETTE TAPES FULL OF OVER 500 PROGRAMS. HERE IS WHAT YOU'LL RECEIVE:

- ⋆ Over 250 Utility/Home Application Programs including a Word Processor, DataBase, Spreadsheet, Account Manager, 2 Basic Compilers, Terminal Programs, ROM Copies, Mail List, Machine Language Tutorials, Plus Much More!
- ⋆ Over 200 exciting games including Warlords, Star Trek, Super Vaders, Solar Conquest, Horse Races, Football, Baseball, Frog Jump, Invader, Plus Much More! (Many machine language games)
- ⋆ Over 30 adventures including The College Adventure, Dungeon Master, Space Lab, Ice World, Ship Wreck, Zigma Experiment. Plus 32K Graphic Adventures.

EACH INDIVIDUAL ISSUE SOLD FOR \$9.00 EACH OR \$450 FOR ALL 50 ISSUES. WE SLASHED THE PRICE TO ONLY 150.00.

REG. \$450 NOW \$150.00

★★THIS MONTH ONLY★★

Buy this package of 500 programs and receive a free 6 month subscription. (A \$35 value)

VISA

RAINBOW CERTIFICATION SEAL

THE GREATEST SOFTWARE DEAL ON EARTH JUST GOT BETTER!

THAT'S RIGHT! THIS MONTH WE'VE DROPPED OUR YEARLY SUBSCRIPTION RATE AN UNBELIEVABLE \$10.00 TO ENTICE YOU INTO SUBSCRIBING WITH US. GET 12 DISKS OR TAPES A YEAR CONTAINING OVER 120 QUALITY PROGRAMS. A SUBSCRIPTION TO T & D SOFTWARE CONSISTS OF 10 READY-TO-LOAD PROGRAMS DELIVERED BY FIRST CLASS MAIL EVERY MONTH.

NO WE ARE NOT THE SAME AS THE RAINBOW ON TAPE. IN FACT, MANY SUBSCRIBERS HAVE WRITTEN IN AND SAID THAT WE ARE MUCH BETTER THAN RAINBOW ON TAPE!

PRICES

	TAPE OR DISK	THIS MONTH ONLY
1 YEAR (12 issues)	~~70.00~~	60.00
6 MO. (6 issues)	~~40.00~~	35.00
1 ISSUE	~~9.00~~	8.00

Michigan Residents Add 4%
Overseas Add \$10 to Subscription Price
Personal Checks Welcome!

- ⋆ 16K-64K Color Computer
- ⋆ Over 4000 Satisfied Customers
- ⋆ Back Issues Available From
- ⋆ July '82 (Over 500 Programs)

OUR LATEST ISSUE CONTAINED
1. Computer I.O.U.
2. Disk Disassembler
3. Bak Chekers
4. Pachinko
5. Stock Charting
6. Haunted Staircase
7. Canyon Bombers
8. Dragon Adventure
9. Graphic Scroll
10. Auto Border

RAINBOW CERTIFICATION SEAL

MasterCard

T & D SUBSCRIPTION SOFTWARE, P.O. BOX 256C, HOLLAND, MI 49423 (616) 396-7577

THE NEW GENERATION

THE NEW
NX-10
(Replaces the SG-10)

COMPLETE NX-10
PRINTER SYSTEM

• 5K BUFFER • IMPROVED NLQ • QUAD HIGH & WIDE PRINTING • EXTENDED CHARACTER SETS • 10 INTERNATIONAL FONTS • IN-THE-CASE ADJUSTABLE TRACTOR • REVERSE LINE & FORM FEEDS • 120 CPS (DRAFT) 30 CPS (LQ) • FONT CONTROL & MARGIN CONTROL FROM CONTROL PANEL • 1 YEAR WARRANTY SERVICEABLE NATIONWIDE • AUTOMATIC LINE CENTERING • LEFT OR RIGHT HAND JUSTIFYING • SINGLE SHEET PAPER FEED • 7 GRAPHICS MODES

COMPLETE SYSTEM

NX-10 • BLUE STREAK II • SUPER GEMPRINT
TYPE SELECTION/TUTORIAL • WORD PROCESSOR 2.2

$309.95 + $10 Shipping and Insurance

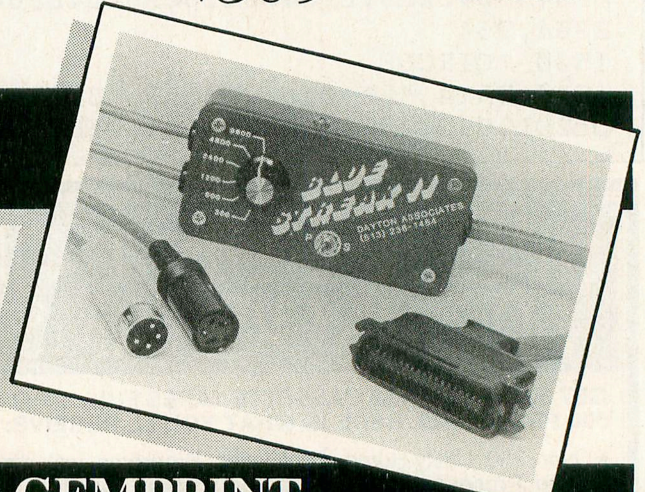
FREE WITH SYSTEM PURCHASE

Drayon's
WORD PROCESSOR 2.2

TAPE OR DISK VERSION

A feature packed program that turns your CoCo into an office machine. Create and save letters and documents with the Word processor tailored for the NX-10.

BLUE STREAK II
SERIAL TO PARALLEL INTERFACE

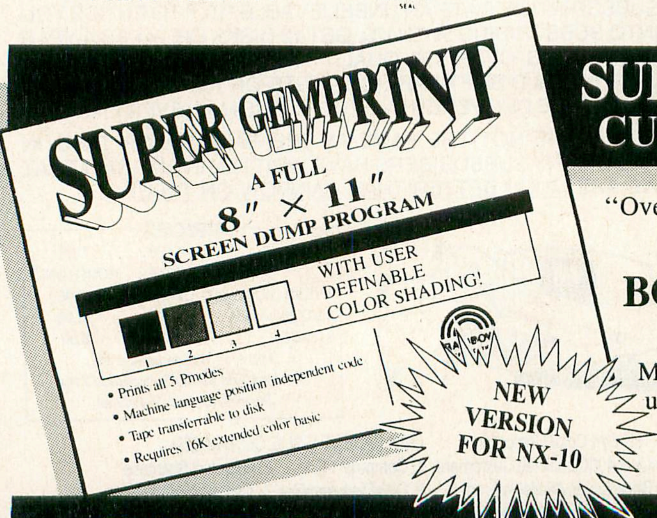


- RUN COCO I or II to PARALLEL PRINTER
- HIGH QUALITY TOGGLE SWITCH ELIMINATES CABLE SWITCHING
- 300, 600, 1200, 2400, 4800, 9600 SWITCHABLE BAUD RATES
- AC POWER OPTIONAL-NOT NEEDED WITH NX-10 PRINTER
- COMPLETE WITH **ALL** CABLES AND CONNECTORS
- THRU-PUT EQUIVALENT TO BUFFERED INTERFACES
- 1 YEAR WARRANTY

RAINBOW CERTIFICATION SEAL

$54.95 SHIPPING PAID!

SUPER GEMPRINT
CUSTOM SOFTWARE



SUPER GEMPRINT
A FULL
8″ × 11″
SCREEN DUMP PROGRAM
WITH USER DEFINABLE COLOR SHADING!

1 2 3 4

- Prints all 5 Pmodes
- Machine language position independent code
- Tape transferrable to disk
- Requires 16K extended color basic

NEW VERSION FOR NX-10

"Overall, **Super Gemprint** is very well-written and documented."
—Rainbow December 84 review.

BONUS! TYPE SELECTION/TUTORIAL PROGRAM
FREE WITH SUPER GEMPRINT

Menu driven program for the CoCo. Teaches and shows the new user the numerous features of the **NX-10**.

SUPER GEMPRINT AND TYPE SELECTION/TUTORIAL PROGRAM **$17.95** + $2 Shipping and Handling

DAYTON ASSOCIATES of W.R. HALL, INC.

star micronics • inc
AUTHORIZED DEALER

DUN & BRADSTREET LISTED
7201 CLAIRCREST BLDG. C
DAYTON, OHIO 45424
OHIO RESIDENTS ADD 6% SALES TAX
C.O.D. ADD $2.00

AUTO•ORDER LINE
1-800-251 STAR
Personal Service
(513) 236-1454

RAINBOW REVIEWS

C Compiler
Economy with Versatility/*Radio Shack* 143
Car Dealer Assistant
A Big Help on the Lot/*Sylvester Software* 142
CoCo Diskzap Utility
Modify or Repair Programs/*SuperCom Associates* 147
Colorchestra
Lets the Music Flow/*Horizon Software* 135
Disk BASIC Unraveled
Valuable Library Addition/*Spectrum Projects Inc.* 146
Graphic Echo
Screen Dump for All Seasons/*Tothian Software* 138
Max Fonts
CoCo Max Add-on/*Derringer Software* 144
The Memory Game
Develop Concentration/*Mikaron Software Company* 146
Memory Manager
Move Into Control/*Dynamic Electronics, Inc.* 139
Micro•Fire
Speeds Up the Joystick Action/*Duck Productions* 148
Mission: F-16 Assault
Action for Serious Game Players/*Diecom Products* 136
Pumpman
Good Graphics, Rapid Action/*Saguaro Software* 134
Seikosha SP-1000A Printer
Power for the Little Guy/*Cinsoft* 148
Unkill
Help for Lost Programs/*Proper Programs* 144
Wall Street
Keeps the Interest Flowing/*Drayon Software* 137
WordPak-RS
Widen Your Video Horizons/*Spectrum Projects Inc.* 149

HOW DO YOU TOTE A RAINBOW?

It's simple — Give a RAINBOW gift certificate . . .

Let a gift subscription to THE RAINBOW carry the premier Color Computer magazine right to your friends' doorsteps. THE RAINBOW is *the* information source for the Tandy Color Computer.

Each month, your friends will enjoy the intelligent programs, reviews and articles written exclusively for their CoCo.

First, your gift will be announced in a handsome card. Then, all year round, they'll remember you and your thoughtfulness when they get each edition of THE RAINBOW — over 250 pages loaded with as many as 24 programs, 15 regular columns and lots of helpful hints and tips.

Generosity benefits the giver, too. There'll be no more searching for lost copies of THE RAINBOW. Your collection will be safe at home.

Give a RAINBOW gift certificate and let your friends in on the fun. THE RAINBOW is the perfect companion for the Color Computer!

Please begin a one-year (12 issues) gift subscription to THE RAINBOW for:

Name ______________________________
Address ____________________________
City ______________ State __________ ZIP __________

From:

Name ______________________________
Address ____________________________
City ______________ State __________ ZIP __________

☐ My payment is enclosed
Bill to: ☐ VISA ☐ MasterCard ☐ American Express
Acct. # ______________________ Exp. date __________
Signature ___________________________

Mail to:
Rainbow Gift Certificate, The Falsoft Building, P.O. Box 385, Prospect, KY 40059

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST.
All other inquiries call (502) 228-4492.

Subscriptions to THE RAINBOW are $31 in the United States; U.S. $38 in Canada. The surface rate to other countries is U.S. $68; the air rate, U.S. $103. Kentucky residents add 5% sales tax. **U.S. currency *only*, please.** All subscriptions begin with the current issue. Please allow 6 to 8 weeks for delivery. In order to hold down non-editorial costs, we do not bill.

RECEIVED & CERTIFIED

THE FOLLOWING PRODUCTS have recently been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

Artificial Intelligence Package, consists of three programs. The *Happiness Expert* calculates your happiness quotient and offers advice based on responses; *Poet* composes endless reams of poetry on screen or printer; and *Therapist* asks about your problems, hen engages you in conversation. *Thinking Software, 46-16 65th Place, Woodside, NY 11377, $34.95.*

CoCo-Util, a powerful and flexible utility program that allows you to transfer Tandy Color Computer disk files to your MS-DOS machine. You can also transfer MS-DOS files to a Color Computer disk. Migrate application data files from one system to another and save countless hours of retyping. *Mark Data Products, 24001 Alicia Parkway #207, Mission Viejo, CA 92691, $39.95 plus $2 S/H.*

DCM — RS232c, two-position modem/printer selector. This device allows connections of any two serial devices to CoCo's serial port at one time. *Derby City Software, 3025 Kozy Kreek Drive, Louisville, KY 40220, $34.95.*

Disk Anti-Pirate, for 16K/32K/64K CoCo disk systems. This program copy protects BASIC and ML programs on disk using a variety of protection schemes. Autostart programs, encrypt them with your own password and use optional key/commands and functions to disable. *Microcom Software, P.O. Box 214, Fairport, NY 14450, $59.95.*

Disk BASIC Unraveled, a book containing detailed and documented disassembled listings of Disk BASIC Versions 1.0 and 1.1. Readers need knowledge of 6809 assembly language programming. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $19.95 plus $3 S/H.*

Dragons Temple, a 64K ECB Adventure game. Join King Art's court on a quest for the unknown treasures rumored to be in the dreaded home of Smokey, the fire-breathing dragon. Begin your journey into the dragon's temple armed with a lamp and plenty of oil, for once the lamp goes out, you see only the monster's glowing eyes and the gleaming treasure. *JADE, RFD #2, Box 2740, Clinton, ME 04927, $13.95.*

GRX-DMP II, a graphics screen print utility for bit-image printers such as the DMP-105. This enhanced version prints from `PMODE 4, 3 or 1.7`, is shorter, runs faster and works on disk and cassette bases. *Sigma Software, 14024 152nd Avenue, Renton, WA 98056, cassette $7.95; disk $8.95.*

Phalanx, a 32K machine language game of Alexander the Great. The scenario places you in the year 334 B.C. when a young Macedonian King named Alexander led a small but well-trained army into the ancient land of Persia. You, as Alexander, control 16 units against an army of Persians in a Simulation of tactical combat. *Ark Royal Games, P.O. Box 14806, Jacksonville, FL 32238, tape $20; disk $22.*

Quest for Reality, a 32K ECB Adventure game requiring one joystick. The scenario places you in The Weird Zone, a dream-like fantasy world. The object is to find the Orb of Reality and be set free. Features animated graphics screens and special MAP command. *Steve Britton, Route 2, Box 1015, Friendsville, TN 37737, $21.95 plus $1.50 S/H.*

Ultra Label Maker, lets user compose label on Hi-Res screen displaying label just as it will be printed with spaces, italics and underlining. A companion program, *Fontedit*, is included for producing custom drivers for any printer. Labels can also be numbered. *CMD Micro, 17435 57th Avenue, Edmonton, Alberta, Canada T6M 1E1, $14.95 plus $2 S/H.*

Universal Monitor Drive, available in three configurations for the CoCo. V.D.1 is designed to drive a color or monochrome monitor with sound capability. The V.D.2 can be used for monitors without sound, and the V.D.3 drives both color and monochrome monitors simultaneously. No soldering required. *Derby City Software, 3025 Kozy Kreek Drive, Louisville, KY 40220, $28.95 each.*

WordPak-RS, an 80-column video board for the CoCo. This board is designed for OS-9 Version 2.0 and allows use of screen control codes. *Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $99.95 plus $3 S/H.*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Judi Hutchinson

REVIEWING REVIEWS

OS-9 Version 2.00

Editor:

In the July 1986 [Page 166] review of Radio Shack's *OS-9 Version 2.00*, Mr. Goldwasser tells of a problem with the Config utility. His problem was a mirror-image of my own: disks that would not boot up from Disk BASIC.

I learned that the problem stems from not setting the execution directory to /DO/CMDS after inserting the boot/config disk. You need to enter `CHX /DO/CMDS` before you enter `CONFIG`. The documentation was not too specific about this step.

Keep up the good work RAINBOW!

Paul Kapaldo
N. Olmstead, OH

The Enhancer

Editor:

I was very pleased with Jerry Semones' review of *The Enhancer* [May 1986, Page 207]. However, I think the EVAL command explanation was slightly confusing. To illustrate the power of EVAL: When you enter `PRINT VAL("5+7")` the computer displays 5.

On the other hand, `PRINT EVAL("5+7")` produces a result of 12. EVAL can evaluate any legal formula; `VAL` can evaluate only actual numbers.

I hope this clears up the confusion, and demonstrates the power of EVAL. Once again, I thank Mr. Semones for his excellent review.

David Skoll
H.D.R. Software

Homeware

Editor:

I would like to comment on the review of our *Homeware* home management package [July 1986, Page 169]. While the review is largely accurate for five of the six modules that comprise *Homeware*, I think there may be some misunderstanding with the description of the word processor module, *Homwrite*.

It is stated that *Homwrite* contains "both typewriter mode and insert modes." As I understand typewriter mode, it is a mode in which a word processor prints on paper immediately, line by line as you type, rather than waiting until you have typed the entire document. *Homwrite* is set up so that printouts are done after the entire document is typed on screen. There is a mode in which you can type over anything that already may be on screen at the cursor's position, and there is another mode in which your typing is inserted in front of anything that already may be at the cursor's position.

The review states that "the printout is single spaced." As explained on page three of the instructions, the spacing can be changed easily by using the Spacing option that appears on one of the *Homwrite* menu screens.

Finally, since I regularly use *Homwrite* to do my own correspondence-type word processing, I am puzzled by the statement that *Homwrite* is "not on a par with the other modules." While it lacks features commonly found in more complex word processors, I find the program perfectly adequate for letter-writing and similar small household jobs for which it is intended.

Jim Toth
Tothian Software, Inc.

The Best Epson Screen Dump Utility

Editor:

Mr. van der Poel announces himsel puzzled over a problem I experienced whil reviewing *The Best Epson Screen Dum Utility* [February 1986, Page 216]. Thi problem is screens printed at an offset of few bytes from their correct starting address

Users should be grateful for the additiona clarification Mr. van der Poel's letter afford [August 1986, Page 132].

R.W. Odli
Sedro-Woolley, W

CGP-220 Screen Dump Package

Editor:

The recent review of my program *CGP 220 Screen Dump Package* illustrates ho easy it is for a programmer to forget that no everyone using a computer is an expert. M omission of examples showing how to us the CLEAR statement to reserve memory fo various programs in the package is a case i point.

The documentation now contains examples showing how to use the CLEAR statement. My thanks to your reviewer, Cra Augsburg, for bringing this oversight to m attention.

Bob van der Poe
CMD Micro Computer Services, Ltd.

We welcome letters to "Reviewing Reviews" and remind you that they may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

Telewriter-64™
the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
- **True lower case characters**
- **User-friendly full-screen editor**
- **Right justification**
- **Easy hyphenation**
- **Drives any printer**
- **Embedded format and control codes**
- **Runs in 16K, 32K, or 64K**
- **Menu-driven disk and cassette I/O**
- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
>
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

RAINBOW
CERTIFICATION
SEAL

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
>
> — The RAINBOW, Jan. 1982

PROFESSIONAL WORD PROCESSING

You can no longer afford to be without the power and efficiency word processing brings to everything you write. The TRS-80 Color Computer is the lowest priced micro with the capability for serious word processing. And only Telewriter-64 fully unleashes that capability.

Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

To order, send check or money order to:

Cognitec
704 Nob Street
Del Mar, CA 92014

Or check your local software store. If you have questions, or would like to order by Visa or Mastercard, call us at (619) 755-1258 (weekdays, 8AM-4PM PST). Dealer inquiries invited. (Add $2 for shipping. Californians add 6% state tax.)

Available at
Radio Shack stores
via express order
catalogue #90-0253
90-0254

Apple II is a trademark of Apple Computer, Inc.; Atari is a trademark of Atari, Inc.; TRS-80 is a trademark of Tandy Corp; MX-80 is a trademark of Epson America, Inc.

CINSOFT
PROGRAMS • PERIPHERALS • SUPPLIES • SERVICE

For Coco . . .
in the Midwest

Now in our 4th year!

New Catalog Now Available
CALL OR WRITE

Introducing . . .
SEIKOSHA
SP-1000A

RAINBOW CERTIFICATION SEAL

- 100 cps draft
- 20 cps NLQ
- Friction and tractor
- Front panel Controls
- Graphics
- 1.5 K buffer
- 2 yr. Warranty

See Review Page 148

Parallel printer $209.00
with Metric Industries Model 104 interface $249.00
"The New Leader in Price-Performance!"

Coco Max
The Complete . . .
CoCo Max II System
includes . . .
✓ Deluxe Joystick and Y-cable !! $ 119.95
CocoMax II .... $ 79.95
with Y-cable 99.95
with Joystick 99.95

LATEST VERSION FEATURES . . .
- 14 fonts
- Shrink, Stretch Rotate
- Multiple drives
- Pattern Save

UPGRADES AVAILABLE
Disk I to II 20.00
Tape I to Disk II 25.00
Max Edit 19.95
Picture disks available

New! DELUXE JOYSTICK
RAINBOW CERTIFICATION SEAL
EXCELLENT FOR COLOR COMPUTER
USE IT FOR GRAPHICS, GAMES, ETC.
CoCo owners will appreciate this high quality, durable joystick. Open gimbal design ... self-centering or free-floating operation. Mechanical trims on both axes ... eight foot cable ... firing button has lifetime 5,000,000 presses. A two-button version of the Deluxe Joystick is available for the Tandy 1000. DEALER INQUIRIES INVITED
$27.50 each
$49.95/pair

CHOOSE FROM OUR LARGE SELECTION OF COCO PRODUCTS
B5 ... Colorware ... Derringer ... Diecom ... Dynacaic ... Elite ... Four Star ... HJL ... J & M ... Mark Data ... Metric Industries ... Michtron ... Microcom ... Microworks ... Tom Mix ... PBJ ... PXE ... Spectrum Projects ... Speech Systems ... Sugar ... TCE ... VIP ... Zebra ... and more!
Yes! We have PENPAL!

• Call •
513-396-SOFT
• Shop by Modem •
513-396-SHOP

VISA
AMERICAN EXPRESS

• Write •
2235 Losantiville, Cincinnati, OH 45237
SHIPPING will be charged at our ACTUAL COST
Ohio residents add 5.5% Sales Tax COD add 2.00

Rapid Action, Good Graphics Highlight *Pump Man*

Man the joysticks! Aliens are attacking underground ar it is your job, as Pump Man, to stop them.

PumpMan is Saguaro Software's version of the arcac game *Dig Dug*. In it, you must dig tunnels under the grour in an attempt to trap and blow up aliens using a hig pressure air pump. Or, lead the aliens up a tunnel and drc a rock on them. But beware, these aliens can transpo themselves through solid rock, and pop into one of yoı tunnels. Watch your step near the fire-breathing dragon!

Quite honestly, I'll confess to being an arcade *Dig Du* addict. It offers a wonderful diversion from shoot-'em-uן and provides a delightful challenge. This is why, when received *PumpMan* to review, I immediately pounced c my joystick and got ready for hours of fun.

Is *PumpMan* fun? It sure is. But, I must admit to havir mixed feelings about the game. While the game wa certainly welcome and well-used around my house, couldn't help but feel that it could have been better.

PumpMan comes on a copy-protected disk, or available on cassette. While I generally dislike cop protection schemes, I can't fuss too much about the one use for disk, since it does let you make a non-executable backu of the program. If something happens to the original, simpl back up the copy (which won't work by itself) onto th original disk and it should work. Loading the game is a easy as typing `LOADM "PUMPMAN"`.

The game is played with one joystick to move Pump Ma in one of four directions. The firebutton activates the pump I sometimes had trouble turning right or left with the olde joysticks. It was a frustration to me that the firebutton di not autofire. Holding down the button does not keep th pump activated; you must constantly press it, and even the it sometimes doesn't register.

The graphics are good, and the action rapid. Th animation, however, is often flickery which, while nc affecting the game play, can be mildly annoying. On the plu side, *PumpMan* keeps your interest, has a game paus feature and comes with 15 board variations. The game' sound effects are adequate, but I do miss the catch background music found in the arcade version. Most all th other features of the arcade game are included, though.

The two-page documentation covers all the necessar features of *PumpMan*.

On a rating scale of one to five, I'd rate *PumpMan* a follows: playability, three; keeps interest, four; documen tation, three; graphics, three; sound, two and price vs. value three.

PumpMan is a fun game, and it is evident that Dave Dies the author, has a great deal of talent. As it is, it's very good but a few more weeks of work could have made this gam outstanding.

(Saguaro Software, P.O. Box 1864, Telluride, CO 81435, $24.95 tape, $29.95 disk; $1 S/H. Requires 32K and joystick)

— Eric W. Tileniu

Colorchestra Lets the Music Flow

Since I am in a country rock band, write my own music, nd own a computer and a synthesizer, I was thrilled when received Colorchestra, a MIDI sequencer for the Color omputer. There are many MIDI sequencers for other omputers but not for the Color Computer. Now those of s who own CoCos and synthesizers won't be tempted to uy another computer to use with our musical instruments. efore I review Colorchestra though, I had better give a ittle history and explain what MIDI equipment is supposed o do.

MIDI (Musical Instrument Digital Interface) is a niversal language adopted by most musical instrument anufacturers so that MIDI-equipped instruments can ommunicate and control each other, regardless of which ompany makes the instrument.

When electronic music was first being developed it was ossible to interconnect or interface to monophonic ynthesizers by using simple voltage signals. But as omputerized polyphonic synthesizers became the norm, he old techniques of interfacing became too cumbersome. So MIDIs were developed. They use eight-bit signals to erially transmit all kinds of information from one nstrument to another.

Colorchestra is a very attractive product. There is even a ROM pack made of walnut! The documentation is packaged in a sturdy binder and there is a cassette version as well as two disk versions. The software is not copy protected, so make and use copies. You must have the hardware and the software to make it work.

The many features include: works with any MIDI-equipped synthesizer or rhythm machine; 16 polyphonic multifunction tracks; 8,000 note storage not dedicated to any specific track; user friendly Hi-Res graphics interface; real time write mode; solo capability on any track; varying tempo range from 30 to 250 beats per minute; audible and visual metronome; programmable measure locator; sequencer records from any MIDI channel (1-16); each track can output to any MIDI channel (1-16); records full spectrum of MIDI data including program changes, pitch bends and all 128 available MIDI controllers; accepts or transmits MIDI synchronization for rhythm or drum machines; and programmable time signature plus many others.

To use Colorchestra you need a 64K Color Computer and any MIDI-equipped device. With disk drive you also need a Y Cable or a multipack. It does not matter what version of DOS you have because the program makes no ROM calls.

Colorchestra is the beginning of a series of programs from Horizon that allows you to work with the CoCo and a MIDI.

It is not a problem to boot up Colorchestra in either cassette or disk format. In the main menu you will see a well-designed screen of icons giving eight choices. They are Multitrack Recording, Track Editing, Toolbox Menu, Control Panel Menu, Help, Disk I/O, Cassette I/O and System Trash. To choose any of the options is simply a matter of using the arrows to move and pressing ENTER.

Multitrack recording is the heart of the program. Here you can record in any or all of the 16 tracks after selecting recording or playback options. Your options include Recording Resolution (used to clean up timing errors), Time Signature, Tempo, Metronome Mode (to control timing and sychronization with other machines) and Track Selection. When ENTER is pressed, recording begins after one measure. To end recording, press BREAK, which returns you to the main menu.

Track editing and the Tool kit give you the ability to change what you have recorded. You can change individual notes or completely transpose your composition from one key to another.

The control panel is used to change Colorchestra's general options: MIDI echo controls, velocity controls, sequence title, real time filter settings, MIDI in channel selection and MIDI out channel controls .

The options for Help, Disk I/O, Cassette I/O and System Trash are all self-explanatory and easy to use. Each option uses icons and the arrow keys for selection. In the Disk I/O menu you can Load, Save, Kill, Rename and get a directory. In the Cassette I/O you can Save, Load and Verify.

If you have MIDI equipment and a CoCo, now there is a product to let the creative juices flow. Colorchestra is the beginning of a new world for CoCo musicians.

(Horizon Software Corporation, P.O. Box 289, Opelousas, LA 70570, 64K required, $149.95)

— Thomas E. Nedreberg

J&R ELECTRONICS

Complete 256K and 512K Memory Expansion Systems
(Hardware, Software and documentation included)
User friendly software, programmer not required

Easy, Solderless Installation

★ We have eliminated the necessity to piggyback for 512K versions! ★

RAMDISK — Fast disk I/O, 35/40 track (two RAM drives with 512K)

PCOPYMOR — More than 30 PMODE 4 screens in memory at once! PCOPY command modified to accept PCOPY 1 to 128. More than 70 PMODE 4 screens and PCOPY 1 to 302 with 512K versions (or 30 PMODE 4 screens with one RAMDISK).

SPOOLER — HUGE printer buffer for offline storage inside your computer while the printer's busy. Customizable from 30K to over 200K (500K with 512K versions). Buffer can be turned off/on copied using simple PRINT CHR$ commands.

OS9 Ramdisk — Fast OS-9 disk I/O! 35/40 track single sided or 40 track double sided (512K) Ramdisk under OS9! GOOD's OS9 Ramdisk (Rainbow Feb '86) with fully commented source code and install files added by J&R. (Requires OS9 operating system)

ALL software above is configurable for 256K/512K operation.
Software shipped on disk, add $10.00 for software on tape. (OS9 RAMDISK not available on tape).
ALL boards below are 256K/512K capable, software & documentation included.
New SAM (74LS785) not included (use your 74LS783), 74LS785 recommended for 2.0 MHz operation.

Part number	Price	Description
#1001	$39.95	Banker II bare board (with long pin socket, does not include memory Expansion Board)
#1002	$69.95	Banker II bare board + parts (does not include Memory Expansion Board)
#1003	$89.95	Banker II assembled & tested (no memory)
#1004	$129.95	Banker II (256K, upgradable to 512K) assembled & tested with memory
#1005	$169.95	Banker II (512K) assembled & tested with memory
#1006	$15.00	Memory Expansion Board
#1007	$29.95	Memory Expansion Board + parts
#9000	$89.95	Down Under Controller. Ram Pack size controller with BDOS Gold plated, high reliability edge connectors, jumpers for 24/28 pin ROM. Compatible with COCO I and COCO II.
#9001	$35.00	BDOS (Enhanced DOS on 27128 EPROM)
#9002	$5.00	64K switch
#9004	$24.95	New SAM 74LS785 (required only for 2.0 MHz operation)
#9005	$24.95	★New!★ PowerBasic — Introductory Price. (Requires RSDOS 1.0 or 1.1 and 256K or 512K Banker) Utilize the extra memory for variable storage and pass variables between programs in different pages of memory. Split a large BASIC program into smaller pieces and GOTO or GOSUB a line in another page of memory. . . and more features included. (disk only)
#9006	$10.00	S/W Pac upgrade. 1.XX to 2.XX

To place an order, write to J&R Electronics, P.O. Box 2572, Columbia, MD 21045,
OR call (301) 987-9067 — Jesse or (301) 788-0861 — Ray.

HOURS: Weekdays 7 p.m.-9 p.m.; Sat. Noon-5 p.m. EASTERN TIME.

Add $4.00 shipping & handling (FOREIGN ORDERS $7.00), COD charge $3.00. Maryland residents add 5% state tax.

CHECKS, MONEY ORDERS OR COD's only please (personal check — 2 weeks for clearance). IMMEDIATE DELIVERY. Give COCO Radio Shack model # (i.e. 26-3136), Disk or Tape when ordering.

QUANTITY DISCOUNT AVAILABLE. For information on shipping or previously placed orders call (301) 788-0861. COCO II 26-31XX owners call (soldering experience may be required).

Software Review

Mission: F-16 Assault: A Must for Serious Game Players

You're flying over enemy terrain at about Mach 2. Suddenly you see the first target, a group of unprotected buildings. You speed up as you drop bombs to destroy this target. But before the bombs hit the ground, a blip appears on the radar. You know what that means, so you get ready for combat. An enemy helicopter glides onto the screen and you fire furiously at the craft for a few seconds before destroying it. You wipe your brow and continue with the mission.

No, you haven't joined the Air Force, you're playing *Mission: F-16 Assault*, one of Diecom's newest 64K arrivals. Of all of the games I've played on my CoCo, this new release from Diecom has to be one of the best. Its graphics and animation are the best I have seen in an action game, and it has down-to-earth logic.

The scenario is as follows: You are in control of a white jet fighter. The ground scrolls beneath the plane. You have full control of the jet's movement around the screen. Your missiles fire forward and the bombs are dropped to the ground.

The entire playing field is situated over enemy territory which is dotted with different types of defenses. There are several tactical areas, including refineries, airports and other vital locations. Points are awarded for destroying these targets. Not only are these land sites targets, but som also serve the enemy. Airports, for example are used t launch airplanes, and once destroyed, aircraft may n longer take off from that site. There are other sites whic are unique in this way, such as missile silos and helicopte pads.

The enemy uses several kinds of defense against you aircraft. These include missiles, jet aircraft, helicopters boats and tanks. They may all be destroyed except for th surface-to-air missiles and the enemy's missiles which fir from the jet aircraft and helicopters.

All flying aircraft take off from a ground site such as a airport or helicopter pad. Therefore, these craft may b destroyed both on the ground and in the air. To destro anything on the ground, you must drop a bomb. To destro an enemy in the air, you must use missiles which fire forward from your aircraft.

Radar is on the right side of the screen and indicates most enemy craft positions. There is one special enemy aircraft which can be used to jam your radar. This aircraft must be destroyed before your radar is destroyed.

Some other features in this game are: a bonus aircraft for every 10,000 points, a pause and restart feature, and a high score board.

I love this game, and give it a full five-star rating. *Mission: F-16 Assault* is a must for all serious CoCo game players.

(Diecom Products, 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8. Tape or disk $28.95 U.S., $38.95 Can.)

— Pat Downard

PERRY COMPUTERS

COLOR COMPUTERS	LIST PRICE	OUR PRICE
26-3136 16K Standard Color Computer 2	$119.95	$ 99.00
26-3127 64K Extended Color Computer 2	199.95	169.00
26-3131 Disk Drive 0 for Color Computer	299.95	240.00
26-3130 Disk Drive 1 for Drive 0	199.95	169.00
26-3008 Joystick	19.95	16.95
26-3012 Deluxe Joystick (EACH)	29.95	25.00
26-3018 Extended Basic Kit	39.95	36.00
26-1208 CCR-81 Tape Recorder	59.95	50.00
26-1173 DCM-3 Direct Connect Modem	59.95	50.00

SOFTWARE		
30001210 Telewriter 64 Tape	$ 49.95	$ 42.00
30001220 Telewriter 64 Disk	59.95	49.00
30001110 VIP Writer	69.95	59.00
30001140 VIP Database	59.95	49.00
30001150 VIP Terminal Disk	49.95	45.00
30001170 VIP Integrated Software	149.95	139.00
30001130 SS/DD 10 Pack Diskettes	21.00	14.00

PRINTERS AND ACCESSORIES		
26-1276 DMP-105 80 cps Dot Matrix	$199.95	$169.00
26-1280 DMP-130 Dot Matrix	349.95	285.00
20001025 EPSON LX-80 Printer	369.95	225.00
20001515 EPSON LX-80 Tractor Feed	29.95	25.00
20021070 OKIDATA 182 Printer	299.00	245.00
20041020 STAR SG-10 Printer	299.00	250.00
30009110 BOTEK Serial to Parallel Interface		59.00

TANDY COMPUTERS	LIST PRICE	OUR PRICE
26-1070 Model 4D Desktop 64K 2 FD & Deskmate	$1199.00	$ 895.00
25-1000 Model 1000 1 FD 128K & Deskmate	999.00	705.00
25-1001 Model 1000 1 FD & 10 Meg HD 256K	1999.00	1475.00
25-3000 Model 1200 1 FD & 10 Meg HD 256K	2499.00	1525.00
25-3001 Model 1200 Two FD 256K	1499.00	1200.00
25-4000 Model 3000 One FD 512K	2599.00	1900.00
25-4010 Model 3000 1 FD & 20 Meg HD 512K	3599.00	2600.00
26-3901 Model 600 Port Comp 32K 1 3½ Disk	1599.00	1195.00
25-1021 CM4 Color Monitor	299.95	225.00
25-1022 CM10 Color Monitor	459.95	380.00
25-3010 VM-3 Monochrome Monitor	219.00	185.00
26-5111 VM-1 Monochrome Monitor	199.95	165.00
26-5112 CM-1 Color Monitor	599.00	510.00
25-3043 Graphics Adaptor T-1200, T-3000	299.00	185.00
25-3047 Deluxe Graphics Adapt T-1200, T-3000	499.95	395.00
25-3130 MS-DOS 2.11/Basic Tandy 1200	89.95	75.00
25-4104 MS-DOS 3.1/Basic/Deskmate Tandy 3000	99.95	85.00

CALL TOLL FREE 1-800-248-3823

For Technical Questions and Information on our complete line of computer accessories and current prices:

CALL 1-517-625-4161

Mon.-Fri. 9-5, Sat. 9-3

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted ($10.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., Visa, add 2%. A.X., add 3%. All non-defective items returned will be subject to 10% restocking fee. Defective items require return merchandise authorization. Call for R.M.A. Number before returning. Delivery is subject to product availability.

PERRY COMPUTERS • 124 SOUTH MAIN STREET • PERRY, MI 48872

Wall Street Keeps the Interest Flowing

Wall Street is a game which can be played by one to eight ople, and the strategy involved does not change with the mber of participants. Each player begins the game with ,000 in cash, and tries, through the purchase and sale of mpany shares, to increase his or her holdings to a winning iount which can be set at any number between $2,000 and 99,999,999. *Wall Street* can even be played noncompetvely, i.e., by setting the winning amount of money at a fficiently high level, the players can enjoy refining their ctics and mastering the idiosyncrasies of the program for veral hours without even coming close to a victory.

There are eight American companies to choose from iose high, average and low stock prices are correlated with stock indicator somewhat analogous to the famous Dow nes Average. The object is to maximize profits by buying w and selling high as in real stock exchanges. At first I ought this was a Simulation of the stock market and ticipated some realistic market action. However, this ogram is a game, and its departures from realism make e proceedings swifter, more exciting, and for those who n't get too greedy, more profitable. There is an old saying the stock market, "The Bulls make money, even the Bears ake money, but the pigs . . . they don't make any money!"

For example, there was never a stockholders' meeting like e ones in this game where you go in with X shares of a mpany's stock and emerge with 2X, 3X or 4X and usually ore shares. This is an exhilarating way to live the good fe if you can resist the urge to hold the stock in the hope iat it will double and triple some more, and instead, nvert your shares to cash before the broker's fee is ssessed at $10 per share!

We never did discover the relationship between the mulated rolls of the dice and the ups and downs of the ame. We guessed that perhaps the makers of the program rst created it on a physical board with squares to determine ne's fate for each turn.

As we continued to play we became increasingly coninced that *Wall Street* is to the stock market what Monopoly is to real estate. *Wall Street* is written in BASIC nd comes on an unprotected tape which is easily loaded nd converted to disk. The documentation is adequate, lthough it's hard to understand the game until you play . The game would be improved by writing the current layer's name on every screen; we occasionally had some ontroversy over whose turn it was. Also, some folks wished he program would allow them to liquidate their shares vhile automatically computing scores before reaching the lesignated winning amount.

We are happy to recommend this program. Unlike most games, it has held our interest through several playings, and t a cost of $6 per tape, you'll still have money left over or investing in the real thing.

(Drayon Software, P.O. Box 2516, Renton, WA 98056. Requires 16K ECB, $6.)

— Patricia Arrington

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

Back Issue Availability

Back copies of many issues of **THE RAINBOW** are still available.

All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S. Mail. UPS *will not* deliver to a post office box or to another country.

Issues July 1981 through June 1982 are available on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax. In order to hold down costs, we do not bill and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last.

To order, just fill out the form on the next page and mail it with your payment to:

THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

For greater convenience, order RAINBOW Back Issues through the shopping area of the CoCo SIG of Delphi!

BACK ISSUE ORDER FORM

(See overleaf for instructions.)

(Payment must accompany back issue orders. We do not bill.)

☐ Please send me the following back issues:

NO.	MONTH YEAR	VOLUME 1	PRICE	
1	JULY '81	PREMIER ISSUE	$2.00	☐
2	AUG. '81		$2.00	☐
3	SEPT. '81	EDUCATION	$2.00	☐
4	OCT. '81	PRINTER	$2.00	☐
5	NOV. '81		$2.00	☐
6	DEC. '81	HOLIDAY	$2.00	☐
7	JAN. '82		$2.00	☐
8	FEB. '82		$2.00	☐
9	MAR. '82		$2.50	☐
10	APR. '82		$2.50	☐
12	JUNE '82		$2.50	☐
		VOLUME 2		
11	JUNE '83	PRINTERS	$2.95	☐
12	JULY '83	ANNIVERSARY	$2.95	☐
		VOLUME 3		
1	AUG. '83	GAMES	$2.95	☐
2	SEPT. '83	EDUCATION	$2.95	☐
3	OCT. '83	GRAPHICS	$3.95	☐
4	NOV. '83	DATA COMM.	$3.95	☐
5	DEC. '83	HOLIDAY	$3.95	☐
8	MAR. '84	BUSINESS	$3.95	☐
9	APR. '84	GAMING	$3.95	☐
10	MAY. '84	PRINTER	$3.95	☐
11	JUNE '84	MUSIC	$3.95	☐
12	JULY '84	ANNIVERSARY	$3.95	☐
		VOLUME 4		
1	AUG. '84	GAMES	$3.95	☐
2	SEPT. '84	EDUCATION	$3.95	☐
3	OCT. '84	GRAPHICS	$3.95	☐
4	NOV. '84	DATA COMM.	$3.95	☐
5	DEC. '84	HOLIDAY	$3.95	☐
6	JAN. '85	BEGINNERS	$3.95	☐
7	FEB. '85	UTILITIES	$3.95	☐
8	MAR. '85	BUSINESS	$3.95	☐
9	APR. '85	SIMULATIONS	$3.95	☐
10	MAY '85	PRINTER	$3.95	☐
11	JUNE '85	MUSIC	$3.95	☐
12	JULY '85	ANNIVERSARY	$3.95	☐
		VOLUME 5		
1	AUG. '85	GAMES	$3.95	☐
2	SEPT. '85	EDUCATION	$3.95	☐
3	OCT. '85	GRAPHICS	$3.95	☐
4	NOV. '85	DATA COMM.	$3.95	☐
6	JAN. '86	BEGINNERS	$3.95	☐
7	FEB. '86	UTILITIES	$3.95	☐
8	MAR. '86	BUSINESS	$3.95	☐
9	APR. '86	HOME HELP	$3.95	☐
10	MAY '86	PRINTER	$3.95	☐
11	JUNE '86	MUSIC	$3.95	☐
12	JULY '86	ANNIVERSARY	$3.95	☐
		VOLUME 6		
1	AUG. '86	GAMES	$3.95	☐
2	SEPT. '86	EDUCATION	$3.95	☐
3	OCT. '86	GRAPHICS	$3.95	☐

RAINBOW INDEX A complete index to our first three years, July 1981 through June 1984, is printed in its entirety in our July 1984 issue. Separately bound copies are also available. $2.50 ☐

Note: Our Fourth and Fifth Year Indexes, including RAINBOW ON TAPE indexes, are included in the July 1985 and 1986 issues, respectively.

TOTAL ______

KY RESIDENTS ADD 5% ______

U.S. MAIL CHARGE ______
SHIPPING & HANDLING
U.P.S. CHARGE ______
TOTAL AMOUNT ENCLOSED ______

Name ______
Address ______
City ______ **State** ______ **ZIP** ______

☐ **Payment Enclosed, or charge to my:**
☐ **VISA** ☐ **MC** ☐ **AE**

CARD # ______

EXPIRATION DATE ______ **PHONE #** ______

SIGNATURE ______

To order by phone (*credit card orders only*) call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

Graphic Echo — A Screen Dump for All Seasons

I recently upgraded my computer and purchased a do matrix printer, so I was really excited when I receive *Graphic Echo* to review. Not only can I type letters an reviews, but with this program, I can also send any graphi screen I have to my printer.

The program is written in machine code, and th directions I received explained how to load the program There are also two programs; one is for 16K users and th other is for 32K users. The instructions were short, bu adequate.

To use *Graphic Echo*, load the graphics to be printed int the computer. Run the graphics and press the BREAK ke This stores the graphics into the computer's memor CLOADM the machine language program. Before executin this program, make sure your printer is set to the graphic mode. Your printer instruction book explains this. Whe the printer is set, type EXEC. That's it!

The program only takes a few moments for a regular siz image to be printed. But wait, there's more! You have choice, using pokes, of setting one or more of the followin options: print enlarged image, print regular image, prin negative image, print positive image, set a left margin o automatically center the image.

I experimented with these options, and I was impresse with all of them. I tried different graphics screens and ha no problem with any of them. If, during the printing of a image, you want to stop, just press the BREAK key. This stop the printing.

This program will work with all PMODEs, but it is onl designed to work with Radio Shack printers.

For the price, *Graphic Echo* is a very useful utility fo the CoCo.

(Tothian Software, Inc., Box 663, Rimersburg, PA 16248, $14.95)

— John H. Appel

See You at RAINBOWfest-Princeton October 17-19

Software Review

Move Into Control With *Memory Manager*

So, you have a 64K Color Computer but you're not using OS-9? *Telewriter 64* tells you it has more than 22K of buffer space, but how do you get to it for your own BASIC programs? Is there any way to make use of memory above the ROMs?

Here is a two-program set designed to help you make use of that memory, either with your old programs or with program development. *Memory Manager* allows the use of the second 32K of RAM in several ways. *RAMdisk* is a separate program that uses the 32K of RAM exclusively for storage of programs, both BASIC and machine language.

The programs are available on either disk or tape. A `CLOADM` followed by `EXEC` installs either program. *Memory Manager* allows using BASIC in both 32K banks of memory, or gaining some RAM by transferring the ROM data to upper RAM and transferring the data as a block to an area above the ROMs. *Memory Manager* also allows you to undo any of these procedures.

Running BASIC in both banks introduces a menu that will copy or exchange banks. This makes it possible to keep a copy of a program under development in memory while debugging. `EXEC` accesses *Memory Manager* again to exchange banks or copy either bank if your program crashes.

The all-RAM mode allows approximately 8K of RAM for storage of a short program or data. To store data you must know the beginning and ending locations of the data and where you want them placed. Transferring a program is much easier.

The *RAMdisk* is used exclusively to store programs in memory while any single program may be run in the lower 32K of memory. The *RAMdisk* menu contains Display Programs, Save a Program, Delete a Program, Clear All Programs, Return to Last Program and Load a Program. Each of these options pertains to the programs in the upper memory, except Return to Last Program, which begins running the program in lower memory. The menu always shows the programs already in memory, their length and the memory left. Both BASIC and ML programs may be saved, but the beginning, ending and execution addresses must be known for ML programs.

Even though *RAMdisk* and *Memory Manager* are separate programs, they each contain ML subroutines that can be executed without executing the programs as a whole. Using these subroutines, you can copy ML subroutines into the second memory bank, exchange the data in the two banks, copy to either bank, move data to either bank, change BASIC program vectors and condition memory for the all-RAM mode. The utility of these subroutines is that your BASIC program can access them directly. You can, for instance, store data in upper RAM automatically.

The documentation is 10 pages of error-free, clearly reproduced pages. It explains the programs in general and goes through each menu choice. There are few examples.

Using *RAMdisk* at first proved to be difficult. My first attempts nearly all met with a hung-up machine. The problems begin when programs of any complexity start to run in lower RAM. After the running, even if broken early, re-entering *RAMdisk* or *Memory Manager* with an `EXEC` was an adventure. I had some success when I modified the programs I was saving and running by adding the line `0 INPUT A`. This would keep it from doing anything before I decided my next step.

When you return to the last program from either the *Memory Manager* or *RAMdisk* menu, the program in lower RAM is automatically run. I would suggest to Dynamic Electronics that they modify their programs to not automatically run. You are supposed to BREAK the program if you don't want it to run, but it may have already locked the BREAK key out or poked the machine into conflict with the memory programs. I would think that using these programs for developing your own BASIC programs would be a major inconvenience when your partially developed, fully buggy program starts running every time you return from saving a copy of it or a subroutine.

My efforts at using *RAMdisk* have been successful only in saving and running the simplest of programs. Using *Memory Manager* has met with better success. The two main purposes here are to use memory, either in two equal banks or an 8K block of memory for data or program storage. Although I had some strange things happen when installing *Memory Manager*, when it worked, it worked. I could copy a program to the second bank, then modify the program. If it crashed, I could bring the original back from the second bank. Or, after development, I could copy it to the upper bank and continue developing.

My advice is to make your program-under-development saves to disk. Tape-only users may save time with the *Memory Manager* programs but at a trade-off. The machine may lock up, although there have been times when a reset and `EXEC` have gained successful re-entry to *RAMdisk* and *Memory Manager*, with upper bank data intact.

I envision two markets for these programs. The first are BASIC-only programmers wanting quick and easy RAM storage while they develop their programs. I advise against *Memory Manager* for them. The other potential market consists of those familiar with machine language programming and the CoCo memory. They would be able to take advantage of subroutines in *Memory Manager* or perhaps diagnose the quirks in the program to use it to real advantage.

(Dynamic Electronics Inc., P.O. Box 896, Hartselle, AL 35640, tape $27.95, disk $29.95)

— Dennis Church

CoCo Trend

Computerware Utilities

Name brand software
at least **20%** off
suggested retail.

Prickly Pear Entertainment

15001 Glory Dr. Huntsville, Alabama 35803
(205) 880-COCO (2626)
Call or write for free catalog.

HI-RES II SCREEN COMMANDER

Are you tired of looking at the 16 line by 32 character display on your CoCo? Do you wish you could see more lines and characters? Then HI-RES II is the answer, it can give you the big screen display you've always wanted. It will display 24 lines of 32, 42, 51, 64 and even 85 true upper and lower case characters per line without any hardware modifications.

HI-RES II is the most powerful screen enhancement package available for the Color Computer, yet it is the least expensive. It is completely compatible and transparent to Basic. Once the program is loaded, everything works the same as before, only you have a much better display to work with. It even allows you to have mixed text and Hi-resolution graphics on the same screen or have separate text and graphics screens. It also has an adjustable automatic key repeat feature and allows you to protect up to 23 lines on the screen. HI-RES II features over 30 special control code functions that allow you to change characters per line, protect display lines, change background color, position cursor, switch normal/reverse video, underline, double size characters, erase line/screen/to end of screen, home cursor, character highlight and much more. It works on all models of the CoCo with 16, 32 or 64K and provides automatic reset control so HI-RES II won't disappear when you press reset.

Only $24.95 for Tape and $29.95 for Disk

EDT/ASM 64D

64K DISK EDITOR ASSEMBLER w/DEBUG

EDT/ASM 64D is a Disk based co-resident Text Editor & Assembler. It has a Hi-Resolution 51, 64 or 85 column by 24 line display, so you see your program listings easily. It also supports the PBJ 80 Column Word-Pak cards. The disk also contains a free standing Machine Language Debug Monitor, to help you debug your assembled programs.

The Editor in EDT/ASM 64D is the most powerfull, easy to use Text Editor available in any Editor/Assembler package for the Color Computer. It even has automatic line number generation for easy entry of program material. Some of it's features include:

- Local and Global string search and/or replace.
- Full screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted Tape/Disk files.
- Move or Copy single & multiple text lines.
- Create and Edit disk files larger than memory.
- Hi-Res Text Display 28 to 85 columns by 24 lines.
- Supports the PBJ 80 Column cards Word-Pak I & II.

The Assembler portion of EDT/ASM 64D is the part that creates the Machine Language program. It processes the source file(s) created or edited by the text editor and creates a LOADM or CLOADM binary file on either Disk or Tape. Using library files you can assemble an unlimited size file, using several different disk drives.

- Supports conditional IF/THEN/ELSE assembly.
- Supports Disk Library files (include).
- Supports standard motorola assembler directives
- Allows multiple values for FDB & FCB directives.
- Generates listings to Hi-Res text screen or printer.
- Assembles directly to disk or tape in LOADM format.
- Supports up to 9 open disk files during assembly.
- Allows assembly from editor buffer, Disk or both.
- Full description text error messages.

DEBUG is a free standing program debugger which provides all the functions supported by most system monitors. Some of them include:

- Examine and change the contents of memory.
- Set and display up to 10 breakpoints in memory.
- Remove single or multiple breakpoints.
- Display/Change processor register contents.
- Dump Memory in Hex and ASCII format.
- Fill Memory range with a specified data pattern.
- Move a block of memory.
- Search memory range for data pattern.
- Disassemble memory into op-code format.

Requires 32K and Disk $59.00

"The Source"

Now you can easily Disassemble Color Computer machine language programs directly from disk and generate beautiful, Assembler Source Code for a fraction of the cost of other Disassembler/Source generator programs. And, the Source has all the features your looking for in a Disassembler.

- Automatic Label generation.
- Allows specifying FCB, FCC and FDB areas.
- Save, Load and Edit FCB, FCC, and FDB map on Disk.
- Disassembles programs directly from Disk
- Output complete Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler compatible source files directly to disk.
- Generated source files are in standard ASCII format.
- Built in Hex/ASCII dump/display to locate FCB, FCC and FDB areas in a program.
- Built in Disk Directory and Kill file commands.
- Menu display with single key commands for smooth, Easy, almost foolproof operation.
- Written in fast machine language, one of the quickest and easiest to use Disassemblers available.

Requires 32K and Disk $34.95

TEXTPRO III

"The Advanced Word Processing System"

- 9 Hi-Resolution Display Formats from 28 to 255 columns by 24 lines.
- True Upper and Lower Case display format.
- Three Different Programmable Header lines, re-definable at anytime.
- Programmable Footer line & Automatic Footnote System.
- 10 Programmable Tab stops & 7 Tab Function Commands.
- Automatic Line Justification, Centering, Flush left and Flush right.
- On screen display of underlining and Double size characters.
- Change indents, margins, line length, etc. at anytime in a document.
- Create and Edit files larger than memory, up to the size of a full disk.
- Easily imbed any number of format and control codes for printers.
- Automatic Memory sense 16-64K with up to 48K of workspace.
- Typist Friendly line and Command format entry w/ auto key repeat.
- Fully supports the use of 80 column hardware cards.

TEXTPRO III is an advanced word processing system designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, then most likely you'll be better off with one of the other word processors. But, if you want a powerful word processing program with extensive document formatting features to handle large documents, term papers, manuals, complex formating problems and letter writing, then TEXTPRO is what your looking for. TEXTPRO works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 50 different formating commands you can use without ever leaving the text your working on. There are no time comsuming, and often furstrating menu chases, you are in total control at all times. The formatted output can be displayed directly on the screen, showing you exactly what your printed document will look like before a single word is ever printed. This includes margins, headers, footers, page numbers, page breaks, underlining, column formating and full justification.

Disk $59.95 Tape $49.95

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.

To order by VISA, MASTERCARD or C.O.D. call us at the number listed below (Monday thru Saturday, 8am to 5pm PST).

CER-COMP
5566 Ricochet Avenue
Las Vegas, Nevada 89110
☎ (702) 452 0632 ☎

DataPack II Plus V4.0

SUPER SMART TERMINAL PROGRAM

With AUTOPILOT Executive Command Processor and AUTO-LOG Language Processor

X-MODEM DISK FILE TRANSFER SUPPORT

VT-100 & VT-52 TERMINAL EMULATION

- No lost data when using Hi-Res Display , Even at 1200 Baud.
- 9 Hi-Res Display formats, 28 to 255 columns by 24 lines.
- True Upper and Lower Case Displays.
- 45K Text Buffer when using the Hi-Res Display and Disk .
- Kill the Hi-Res Display Option for an Extra 6K of buffer space.
- ASCII & BINARY disk file transfer via XMODEM.
- Directly record receive data to a disk file while online.
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys & position, insert/delete, tabs & more.
- Automatic File Capture.
- Programmable Word Length, Parity and Stop Bits.
- Programmable Baud Rates from 300 to 19200 Baud.
- Complete Full and Half Duplex operation, no garbled data.
- Send full 128 character set from Keyboard with control codes.
- Freeze Display & Review Information On line with no data loss.
- Complete Editor, Insert, Delete, Change or Add to Buffer.
- Automatic Key Repeat for Buffer Editing.
- 9 Variable length, Programmable Macro Key buffers can store entire programs. Only limited by the size of available memory.
- Programmable Control Character Trapping.
- Programmable Prompt Character or Delay to send next line.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files directly from the Buffer or Disk.
- Supports True Line Break Transmission.
- Save and Load Text Buffer and Program Key to Tape or Disk.
- Disk Commands include: Load, Save, Kill and Directory.
- Display on Screen or Print the contents of the Bufferr.
- Automatic Memory Sense 16-64K (32K required for Hi-Res).
- Program and Memory Status Displays.
- Built in Command Menu (Help) Display.

Auto-Log: is a communications programming language that will enable you to automatically have DPII+ Dial the phone, wait for and respond to a log-on prompt, send commands to a remote system, or even to send an entire program automatically.

AUTOPILOT: is a executive command processor that will automatically process a command file containing a sequence of DPII+ commands including Auto-Log commands.

SUPPORTS: PBJ Word-Pak I, II, R.S. and Double Density 80 Column Cards
Disto Super Controller w/80 column card & parallel printer
PBJ Parallel Printer Card and Dual Serial Port (2SP-Pak)
Radio Shack Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Not Compatible with JDOS
Requires 32K & Disk
Only $59.00

The CBASIC Editor/Compiler V1.1.2

Do you want to write fast efficient machine language programs but you don't want to spend the next few years trying to learn how to write them in Assembly language?

Well with CBASIC, you could be writing them right now!

CBASIC is the only fully integrated Basic Compiler and program editing system available for the Color Computer. It will allow you to take full advantage of all the capabilities available in your color computer without having to spend years trying to learn assembly language programming. CBASIC allows you to create, edit and convert programs from a language you are already familiar with Extended Disk Color Basic, into fast efficient machine language programs easily and quickly. We spent over 2 years writing and refining CBASIC to make it the Best Color Basic compiler available for the Color Computer. We added advanced features like a full blown program editor, Hi-Res text Displays and 80 column hardware support for editing, compiling and even for your compiled programs. Plus we made it exceptionally easy to use, CBASIC is the friendliest and easiest compiler available for the Color Computer.

"The most complete Editor/Compiler I have seen for the CoCo... "
--The RAINBOW, March 1986

CBASIC is for BEGINNER & ADVANCED USERS

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocation and so on, because CBASIC will handle it for you automatically. For Advanced users, CBASIC will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC adds many features not found in Color Basic, like Interrupt, Reset and On Error handling, and much more.

Commands and Extensive Hardware Support

CBASIC features well over 100 compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. CBASIC supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, including Graphics GET, PUT, PLAY and DRAW, all with 99.9% syntax compatibility. CBASIC also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT and INKEY commands.

CBASIC is the only Color Basic Compiler that includes it's own Hi-Res 51, 64 or 85 by 24 line display. It also supports the PBJ "Word-Pak" I, II and R.S. versions as well as the Disto and Double Density 80 column displays. All as part of the standard CBASIC package. You can even include them in your compiled programs by using a single CBASIC command.

CBASIC makes full use of the power and flexibility of the 6883 SAM in the Color Computer. It will fully utilize the 96K of address space available in the CoCo during program Creation, Editing and Compilation. There is a single CBASIC command for automatic 64K RAM control, to allow use of the upper 32K of RAM automatically. When used in compiled programs it will automatically switch the ROMs and RAM in and out when needed. Plus there are two other commands to control of the upper 32K of RAM manually in a program.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing and editing Basic programs, most likely you'll find you want to use it for writing all your Basic programs. It has block move & copy, program renumbering, automatic line numbers, screen editing, printer control and much more.

"The Editor is a very good one and could be the subject for review all by itself. " --The RAINBOW, March 1986

"Comparing ECB's edit mode to CBASIC's text editor is like comparing a World War II jeep to a modern sedan. Both get you to your destination, but what a difference in the ride. -- Hot CoCo, Feburary 1986

The documentation provided with CBASIC is an 8 1/2* 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

"CBASIC's manual is easy to read and written with a minimum of technicalese. " --Hot CoCo February , 1986

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. Compare the performance of CBASIC against any Color Basic compiler. Dollar for dollar, CBASIC gives you more than any other compiler available. Requires 64K & Disk. not JDOS compatible.

"The price tag it carries seemed a bit steep for an integer compiler on first glance, but when you add 64K, hi-res drivers, and full-screen editing, CBASIC begins to look more like a bargain.." -- Hot CoCo February, 1986

"A Complete Editor/Compiler Well Worth its Price"--RAINBOW March 1986

COMMANDS SUPPORTED

I/O COMMANDS : CLOSE, CLOADM, CSAVEM, DRIVE, DSKI$, DSKO$, FIELD, FILES, GET, INPUT,LINE INPUT, KILL, LSET, LOADM, OPEN, PRINT, PRINT@, PUT,RENAME, RSET, SAVEM, WRITE

CONTROL STATEMENTS: CALL,CHAIN, END, EXEC, FOR, NEXT, STEP, GOTO, GOSUB, RETURN, IF, THEN, ELSE, STOP, END, RUN, ON/GOTO, ON/GOSUB, ON ERROR GOTO, ON NMI GOTO, ON IRQ GOTO, ON SWI GOTO, ON FIRQ GOTO, ON RESET GOTO, IRQ ON, IRQ OFF, RAM ON, RAM OFF, RAM64K, IRQ, FIRQ, NMI, SWI, STACK, RETI

COMPILER DIRECTIVES: BASE, ORG, DIM, HIRES, DPSET, GEN, PCLEAR, TRACE ON, TRACE OFF, MODULE

GRPAHICS/SOUND STATEMENTS: PLAY, SOUND, COLOR, CLS, CIRCLE, DRAW, LINE, PAINT, PCLS, PCOPY, PMODE, PRESET, PSET, RESET, SET, SCREEN, POINT, PPOINT, GET, PUT

NUMERIC FUNCTIONS: ABS, POS, RND, PEEK, DPEEK, TAB, ASC, LEN, INSTR, VAL, ERR, ERL, EOF, SWAP, LOF, LOC, FREE, CVN, VARPTR, JOYSTK, SGN, TIMER, OVEREM, DSEARCH, SWITCH, POS@, INKEY

STRING FUNCTIONS: CHR$, LEFT$, RIGHT$, MID$, STR$, TRM$, STRING$, MKN$,INKEY$, BUF$, SWAP$, SWITCH$, HEX$

OTHER/SPECIAL COMMANDS: AUDIO ON/OFF, DATA, DIM, MOTOR ON/OFF, POKE, DPOKE, READ, RESTORE, CBLINK, UNLINK, BRATE, PRATE, MID$=,STACK, VERIFY ON/OFF

To order by mail, send check or money order for the amount of the program plus $3.00 for shipping and handling to the address listed below.

To order by VIAS, MASTERCARD or COD call us at : (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

CER-COMP
5566 Ricochet Avenue
Las Vegas, NV 89110
(702)-452-0632

Car Dealer Assistant — A Big Help Down on the Lot

Car Dealer Assistant is designed for the small to medium sized auto dealer using a CoCo with one drive and a printer. Each disk holds the system program and up to 200 accounts.

Car Dealer Assistant helps the salesman negotiate a price, figure a payment schedule and write up contracts. It also keeps track of payments and customer data for the office.

The package consists of two laminated three-ring binders, one unprotected master disk and the documentation. One binder holds the master disk and documentation. The other is provided for handy storage. The user is encouraged to make backup copies of the master for day-to-day use, and you're reminded to protect yourself with multiple copies of each disk after you've entered data.

The program consists of a machine language loader and several subprograms in BASIC. The line numbers are provided for you to customize so billings and printouts will have your heading, and the computer will contain your local options and taxes. You can do more customizing if you're familiar with BASIC. The author is available by mail with prompt answers.

The program helps you negotiate a price by giving three "what if" computation subroutines: Purchase, Amortization and Roll Back.

The Purchase Computation section lets your customer look at the final cost based on price, down payment, trade-in and other variables that can be changed and recalculated instantly. Amortization lets your customer see monthly payment schedules based on various time frames, percentage rates and/or amount to be financed. The "Roll Back" routine helps when the customer makes a counter offer. You can enter trade-in, down payment, financing and your own out-the-door costs to see whether you can make the deal and still meet your own profit margin.

All the numbers are held in memory, so it's very easy to change any one figure and see how that affects everything else. You also have a print option you can show your customer or keep for reference. The program automatically moves the final figures to the Customer Data and Contract routines.

Car Dealer Assistant also prints contracts. The program is already programmed to print out on either Motor Vehicle and Security Agreement (Form 522 Rev 5/85) or the Motor Vehicle Purchase Order and Disclosures required by federal law (Form 702 Rev 5/85). Different formats would require some knowledge of BASIC to make changes. Printouts are also available for billings, customer payments, vehicle sales and tax reports.

The Customer Data routine is where you'll keep names and addresses, contract information and vehicle data. Each record has a seven character alphanumeric account number. Up to 200 records are stored on the disk in the order recorded (not by account number).

The program can be used to send statements and update customer payment records if you are doing the financing. It allows up to four payments per month.

The documentation is thorough. Each step is flow charted and explained. The system requires a simple password; the rest is menu driven. You simply choose from options shown on the screen and follow instructions and prompts.

Don't be put off by the small price. This isn't a small package. But there had to be some trade-offs to get such a major application on a microcomputer. It's written for a minimal system with one drive — there's no provision for system vs. data disks and it does no sorting.

Access to customer records is by account number only, but all statements have that number and you can print a cross reference list showing the name on each account. There is no error trapping, so a comma in a dollar amount ($12,000) would tell you Extra Ignored and compute only the amount to the left of the comma. But these are insignificant in light of the power of the total package.

(Sylvester Software Services, 3640 Lightner Court, Waldorf, MD 20601, $29.95 plus $2 S/H)

— Bob Dooman

BACK TO COMPUTING!

Name Brand **DISKS** **$1.00** DS DD w/ Tyvek Sleeves Buy 5 get **FREE** Case Buy 10—Color Case C-10 Cassettes 59¢	Dot Matrix/Graphics **PRINTER** **$199** Citzen 120D/NLQ Silver Reed DW $289	**SOFTWARE** over 180 titles discounted Games up to 50% Books/Others 20% CoCoMaxII w/Y Cable $95
Composite **MONITORS** start at **$79** 12" Samsung amber 12" Sakata HiRES . . $99 13" Color/Sound . $159	5¼ 40-Track Slim **DISK DRIVES** **$90** DS DD Hi-Tech (U.S.) W/Case/Pwr $139 Teac DS . . . $109	Smart Auto **MODEMS** **$189** 300/1200 Baud Hayes Comp Free Cable!
SYSTEMS **IBM Compatible** **$499** 256K Kit/135W PS/ Enh Keybd/Color/ Flip Case/360K Drive	**MISCELLANEOUS** Keyboards from $25 Disk Cases/60 . . $16 Printer Intf . . . . . $40 Video Driver . . . $24 Power Strip . . . . $16 Swivel Base . . . . $16 Catalog . . . . . Free	**PARTS** •EPROMS •ROMS •CONTROLLERS •MEMORY DRAMS •CABLES •KITS •ICS •PAPER •LABELS •RIBBONS •DAISY WHEELS

POLYGON COMPUTERS
1316 Wilshire Blvd., Suite 206
Los Angeles, CA 90017
(213) 483-8388

Calif. res. add 6½% tax
All prices subject
to change/stock avail.

Shipping Charges:
2% or $3.00 min.
Monitors/Printers
Hardware extra

See You at
RAINBOWfest-Princeton
October 17-19

C Compiler: All the Features at Half the Price

The *C Compiler* program may be used to compile C language source code programs into executable machine language OS-9 modules. The *C Compiler* reads C language source files from one or more disk files, compiles them into assembly language source files, optimizes the assembly language source code for speed and compactness, assembles the output into relocatable object code modules, and links the object modules to the library functions and other compiled object code modules to produce executable machine language OS-9 modules.

The Radio Shack *C Compiler* comes on two 35-track OS-9 disks. A light blue, spiral-bound manual of more than 100 pages accompanies the disks.

One disk contains the programs needed to compile a C source program to an executable assembly language program. The second disk contains the compiled library functions, definition files, three C source program examples and some assembly source programs.

The first disk contains files for the following: two-pass compiler executive program, macro pre-processor program, compiler pass 1 program, compiler pass 2 program, relocating assembler program, assembly code output optimizer program and assembly code output linker program.

The second disk contains directories for: source header files containing definitions for various applications, the compiled C library functions, three sample C source code programs and a subdirectory of various assembly source listings.

System calls are provided which perform functions such as open or close a file, change execution or data directory, create a new file and so on. These are provided to extend the portability of the language and to save the user from writing the functions. They are needed because these functions deal with the hardware of the system. With these calls, you won't have to know assembly language code to write programs to perform these functions. In fact, there's a system call (_os9()), that lets a C programmer access any OS-9 system call by passing the function code and a pointer to a register structure as an argument.

The pre-processor directive, #ASM, is supported for applications where you must have the speed of embedded assembly language. I found no stacking order of function arguments, so we'll have to experiment if we need this capability.

The optimizer can be suppressed via an option at compile time. This speeds up the compilation. The optimizer shortens the code about 11 percent with a comparable increase in speed, according to Microware. I compared the output of the *line.c* program with and without the optimizer and found that it replaced long branches with short ones where possible (saving one byte each time) and rearranged some code to tighten up things (saving a few more bytes). Of course, a good assembly language programmer could have done the same or better, but for long programs or inexperienced assembly language programmers it's a real boon!

A profiler program is included that keeps track of how many times each function is executed while the program is running. If your program appears to be slow, the profiler can help you find the most-used functions that might require extra effort to speed up the execution time. If it's a memory hog, then the profiler could be used to find functions that are not used and can be omitted.

Something else I really like is the option to output C source code on the assembly output listing. This assists in debugging and/or massaging areas of code that need special assembly language attention to speed up the execution. It helps locate bugs or idiosyncrasies of the compiler, too.

The company that wrote the marvelous, modular OS-9 operating system hard coded the drive number for the library drive in two of the passes! D1 is coded into CC1 at offset $EE5 and in C.PREP at offset $135C (Microware, how could you?). If you have a RAM disk or a hard disk and want to speed up the compiler, you'll need to patch the descriptor name into these locations.

A good source-level debugger would have been great; maybe we'll get one when enough CoCos have 512K of RAM! We need powerful tools so we can produce good software in less time.

A C source code library for the system calls and library functions would be helpful to beginners and software developers.

This is Version 1.00.00; the last revision was done in 1983. Either they did it right the first time, or nobody's spoken loudly enough to make them update. I do suspect though, that this version was adapted from a version supporting one of the earlier OS-9 systems in existence before CoCo OS-9 was born. How about a new version that doesn't hard code the library drive? Throw in bit fields, too, while you're at it.

The *C Compiler* is a good value at $99.95. I recommend it for anyone wanting to learn the C language, and for those who know C and don't want to program OS-9 application programs in assembly language. The features included are comparable to C compilers costing twice as much on other computers.

(Tandy Corp; available in Radio Shack stores nationwide, Cat. No. 26-3038, $99.95)

— Jesse W. Jackson

One-Liner Contest Winner . . .

Learn how pi is calculated. Just enter the number of times you desire and see how close you can get.

The listing:

```
0 CLS:INPUT"HOW MANY TIMES";N:S=
1:FOR I=2 TO N STEP 2:X=I/(I-1):
Y=I/(I+1):S=S*X*Y:PRINT@64,"PI :
";S*2,I:NEXT I:END
```

Richard Goodman
College Station, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

Unkill: Help for Lost Programs

Sooner or later it will happen. You get that long-awaited disk drive and are thrilled with the power and speed it offers. You'll get so carried away that sooner or later you'll accidentally kill a file you didn't mean to. Some of the more expensive utilities in use today have an unkill feature coupled with a lot of other commands. Now a dedicated program called simply *Unkill* can be used if you make that dreaded mistake.

In order to put this program through its paces, I killed a program on one of my disks and then ran *Unkill*. Prompts guide the user through a series of steps to recover the lost program as long as it has not been overwritten in the meantime. When a file is killed, all that really happens is that the first character of the filename is deleted from the directory on Track 17. The rest of the file is still on the disk, but it's no longer retrievable.

This program requires two disk drives and a printer. The printer is used to read the remaining portion of the filename, as well as the file format, program length in bytes and starting granule. The program examines the entire disk for other killed files. All 67 granules are examined and information displayed as to their use. Using the information displayed on the screen and printer you can make some decisions, with the aid of the program prompts, to recover the lost program.

It is not foolproof, however. The user needs to have some working knowledge of the disk file allocation table and how files are written to the disk. Remember, when a file is killed, the file allocation table is reset.

I was impressed with *Unkill*'s ease of use. It's easy on the wallet, too. It may be worth its weight in gold if it saves even one favorite program.

(Proper Programs, P.O. Box 681, Garner, NC 27529, $9.95 plus $2 S/H)

— Jerry Semones

Max Fonts: Valuable Add-On

Derringer Software has produced a useful add-on for *CoCo Max* called *Max Fonts*. The existing *CoCo Max* and *CoCo Max II* provide 14 fonts. With *Max Fonts* you can add up to 72 more. There are three disks, each with 24 fonts. You can buy one, two or all three.

Each of the fonts can be modified using the Style pull-down menu. For those who are not familiar with *CoCo Max*, the Style menu allows you to alter the default printing of the fonts by making them bold, outlined, shadowed or italicized. You can also use any of the styles in combination with each other.

Max Fonts comes with five half-pages of documentation printed in very small type. Two pages are all it takes to explain how to use the product. The remaining three pages are used for showing samples of all the fonts. The instructions are clear and easy to follow.

The only drawback I could find is the disk handling required to use *Max Fonts*. After starting *CoCo Max* you must remove the system disk and replace it with the font disk you want to use. The Load Page command on the file menu is used to load the fonts. Due to the limitation of the size of the pull-down menu, only half (12) of the fonts are accessible at a time.

Should you want to use the original fonts provided by *CoCo Max*, Derringer Software has provided them on each of the three *Max Fonts* disks. This prevents having to remove a *Max Fonts* disk and replace the system disk.

Max Fonts is compatible with the original *CoCo Max* as well as the new *CoCo Max II*. I tested the fonts on both systems and had absolutely no problems. *Max Fonts* is easy to use, well-documented and performs the job as designed and advertised. I recommend this software as a valuable add-on for the *CoCo Max* system user.

(Derringer Software Inc., P.O. Box 5300, Florence, SC 29502-5300, $24.95 each, all three for $64.95)

— Rick L. Earsley

ORDER BY PHONE
C.O.D. 24 Hrs.
Voice(818)904-1398
Data (805)253-0221
300 or 1200 Baud

OR ORDER BY MAIL

5¼" DISKS
SSDD or DSDD
All Guaranteed.
SPECIAL PRICE
LIMITED STOCK

45¢ea.
IN BOX
OF 100

51¢ea.
IN PACK
OF 10

All with lables,sleeves,& tabs. This price is limited to stock on hand. So, HURRY, don't miss out.
We're sorry, but at these already discounted prices, no other discount may be applied to these Disk Prices.

Canyon
County
Devices

P. O. Box C
Saugus, Ca. 91350

Add $1.50 for handling on orders less than $20. COD orders,add $1.50. Calif. sales,add 6.5% Sales Tax.

PRINTER RIBBONS

Catalog#	All Guaranteed Discription	Per Ribbon	Box of 6	$50-$150 per order
101-1090	Brother HR 15/25 (nylon)	$ 6.60	$ 36.15	$ 35.05
101-1410	Centronics 150/152-2/159	$ 6.15	$ 33.65	$ 32.65
101-1505	C.Itoh Prowriter I&II	$ 5.05	$ 27.75	$ 26.85
101-2240	Epson LX80 Spectrum(nylon)	$ 5.95	$ 32.65	$ 31.65
101-2250	Epson MX/FX/RX70/80(nylon)	$ 4.95	$ 27.25	$ 26.40
101-2270	Epson MX/FX/RX 100 (nylon)	$ 6.85	$ 37.60	$ 36.50
101-2900	IBM SelectricII(Correctbl)	$ 1.95	$ 10.90	$ 10.55
101-4315	NEC 5500/7700 Spinwriter	$ 7.40	$ 40.60	$ 39.35
101-4505	Okidata ML80/82/83/92/93	$ 2.15	$ 11.90	$ 11.50
101-4515	Okidata ML84 (nylon)	$ 4.85	$ 26.75	$ 25.90
101-4525	Okidata Microline182/192	$ 8.90	$ 49.00	$ 47.50
101-4970	RadioShack TRS-80 LP VII	$ 7.40	$ 40.60	$ 39.35
101-4970	Gorilla Banana (nylon)	$ 7.40	$ 40.60	$ 39.35
101-5545	Tally/Mannes. Spirit 80	$ 6.95	$ 38.10	$ 36.95

Ribbons for most printers available. Send us your name,address, & discription of printer for Quote & Catalog.
Quantity Discount Prices available in larger quantities. OK to mix ribbons (minimum 1 box per type) for Discounts.
Colors available in some popular types. SEND FOR CATALOG.

Sugar Software

Do you want your reports to look like this?

You can do it all with TIMS -$24.95

- Disk compatible
- Fast Machine Language sort routine
  - sort on 3 fields simultaneously
- With our ML search routines you can
  - search on a selected field
  - search for a specific item
  - search for records within range
- Phrase substitution editor - fast ML delete routines
- Up to 8 user-definable fields per record
  - up to 230 characters per field
  - variable field length
  - variable record length
  (memory allocated is the actual length of the record)
- Upper and lower case
- User-selected report formats
  - report headings
  - full margin control
  - select which records to print
  - select field to print
  - select order in which fields are printed
  - multiple fields per line
- Send TIMS file to either tape, disk or printer — allows you to use the extensive editing capability available with a word processor to add to or combine other data with a TIMS report
- Save, load, append and verify routines

```
SUGAR SOFTWARE PRODUCTS SORTED BY AUTHOR                     TIMS
NOVEMBER 1, 1983                                             PAGE 1
-------------------------------------------------------------------

DENNIS ZAEBST
STATGRAF                EDUCATIONAL             GRADE 10 AND UP
32K         TAPE                $24.95

G.T. BARRICK
THE GREAT USA           EDUCATIONAL             GRADE 4 AND UP
16K         TAPE                $19.95

GARY DAVIS
AUTO RUN                UTILITY                 PROGRAMMER
16K         TAPE                $19.95
```

or this? . . . .

```
SUGAR SOFTWARE PRODUCTS SORTED BY TITLE                      TIMS
NOVEMBER 1, 1983                                             PAGE 1
-------------------------------------------------------------------

PIRATECTOR              GARY DAVIS              UTILITY
DISK     32K    $99.95          PROGRAMMER

PREREADER               S.DAVIS & S.COSTANZO    EDUCATIONAL
TAPE     32K    $19.95          3-6

SILLY SYNTAX            GARY DAVIS              EDUCATIONAL
TAPE     16K    $19.95          GRADE 5 AND UP
```

or this? . . . .

```
SUGAR SOFTWARE PRODUCTS - SORTED BY TOPIC                    TIMS
NOVEMBER 1, 1983                                             PAGE 1
-------------------------------------------------------------------

EDUCATIONAL      GRADE 10 AND UP
DENNIS ZAEBST    STATGRAF           32K     TAPE     $24.95

EDUCATIONAL      GRADE 4 AND UP
G.T. BARRICK     THE GREAT USA      16K     TAPE     $19.95

EDUCATIONAL      GRADE 5 AND UP
GARY DAVIS       SILLY SYNTAX       16K     TAPE     $19.95
```

SUGAR SOFTWARE
1710 North 50th Avenue
Hollywood, Florida 33021
(305) 981-1241

Add $1.50 per program for postage and handling. Florida residents add 5% sales tax. COD orders are welcome. CIS orders EMAIL to 70405, 1374. No refunds or exchanges.

MasterCard VISA

database management system

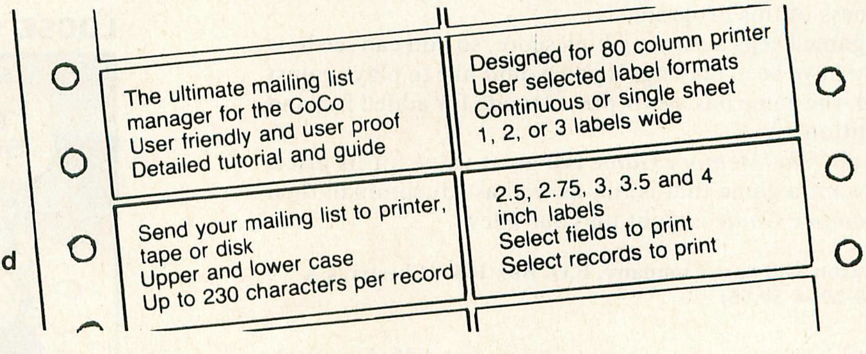
TIMS

TIMSMAIL

$19.95

32K ECB recommended

Disk compatible



The ultimate mailing list manager for the CoCo
User friendly and user proof
Detailed tutorial and guide

Designed for 80 column printer
User selected label formats
Continuous or single sheet
1, 2, or 3 labels wide

Send your mailing list to printer, tape or disk
Upper and lower case
Up to 230 characters per record

2.5, 2.75, 3, 3.5 and 4 inch labels
Select fields to print
Select records to print

TIMS UTILITY

$4.95 - Tape

TIMS UTILITY features:

Multi-Term Search - Search your database using a search criterion based on up to 5 keywords. You can use either "AND LOGIC" or "OR LOGIC".

Global Change - This is the "automatic" version of the modify mode. It can be used when there is a unique set of features in a specified field. For example, we could change all references to Rainbow to RB.

Global Delete - Automatically deletes every record in the database which meets the search criteria.

Record Change - Add or delete fields to your records. The maximum number of fields per record is still 8.

Split File Mode - Use "AND" logic (all articles published in Rainbow and written by Davis) "OR" logic (all customers in Ohio or Maryland), or Range Search to split your large file into 2 or more smaller files. You can save your new file to tape or disk.

TIMS UTILITY comes on tape and is disk compatible. It requires 32K, and a file created with either TIMS or TIMSMAIL.

Develop Concentration With *The Memory Game*

As you probably know, it is hard to find a good software package these days that has some educational value in it. Well, I believe that the people at Mikaron Software have finally bridged the gap between fun and education.

The Memory Game is a 64K, Extended Color BASIC program requiring disk drive. The program comes with *The Memory Game*, Puzzle Disk One (stored on the same disk as *The Memory Game*) and a small instruction card. Although the card is small, it contains some very good information and an example of game play. Loading instructions for the game are on the disk.

The Memory Game is played like a game of Concentration. For those of you who are not familiar with it, I will explain. The screen is divided into 30 boxes numbered one through 30. Behind each box is a point value, which remains constant throughout the game. Each turn, you pick two boxes, revealing their point values. If they match, you gain the points, and the boxes they occupied are filled with parts of the main puzzle. If they don't match, the boxes are replaced and the next turn begins.

The main puzzle is a collection of symbols, objects and letters that represent a phrase or saying when put together. The disk has 10 puzzles on it, so you should have fun for awhile. Mikaron Software says they will have more puzzle disks soon.

I found *The Memory Game* to be very enjoyable and fun to play, but I do have one complaint: The speed of the game is extremely slow. Even though I don't look at this as a plus for the game, some people might. The longer there is between turns, the longer you have to remember the positions of the point values, thereby increasing the effectiveness of this program.

The game keeps a running high score, so you can see how well you have been playing. If you would like to play against a friend, the game has a two-player mode for added fun and competition.

Overall, *The Memory Game* is a great value for its price. If you want a game that is fun as well as educational, then *The Memory Game* is right up your alley.

(Mikaron Software Company, P.O. Box 1064, Chester, CA 96020-1064, $9.95)

— Sean McDonough

CHECKING ACCOUNT INFORMATION SYSTEM

Let your CoCo ease the task of managing your checking accounts with CAIS. Record deposits, checks, ATM transactions, interest, service charges and other debit/credit transactions. Reconcile and balance your accounts in minutes. Search and edit capabilities.

Requires 32K and 1 disk drive (min). Printer optional.

To order, send check or MO for 24.95 plus 2.50 S/H to:
(SC res. add 5% sales tax)

After Five Software
P.O. Box 210975
Columbia, S.C. 29221-0975

RAINBOW CERTIFICATION SEAL

(Reviewed in RAINBOW April'86 issue, pg. 185)

Disk BASIC Unraveled Is a Valuable Library Addition

Here's a book you software hackers out there can really sink your teeth into. *Disk BASIC Unraveled* is a fully detailed and documented disassembled listing of Disk BASIC Versions 1.0 and 1.1. The book is not a tutorial or a how-to manual on machine language, but rather a detailed look at the assembly listings.

The reader needs to have beginning knowledge of 6809 assembly language programming to be able to take full advantage of the opportunities this book offers. It is also assumed that the reader is familiar with the contents of the disk system owner's manual which contains a general description of the overall operation of Disk BASIC and other useful information concerning the physical and logical format of the tracks and sectors.

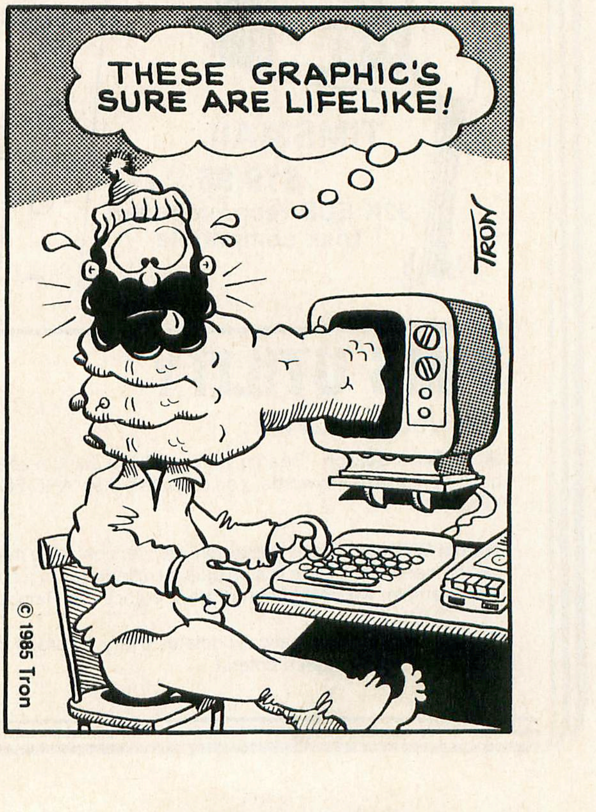
Properly studied and used, *Disk BASIC Unraveled* should help the serious reader understand the theory behind Color DOS, and to modify it for his own purposes or add extra commands or functions.

The book is nicely bound, magazine size and 154 pages long. It's full of useful information for the serious CoCo hacker. There is even a nice section that deals with the 1793 Floppy Disk Controller, which I found to be very useful. If you are inclined toward machine language programming, you will benefit from this publication.

(Spectrum Projects Inc., P.O. Box 21272, Woodhaven, NY 11421, $19.95 plus $3 S/H)

— Jerry Semones

LOOSE STRINGS / by Tron


THESE GRAPHIC'S SURE ARE LIFELIKE!
TRON
© 1985 Tron

Speedy *CoCo Diskzap Utility* Does the Trick

The *CoCo Diskzap Utility* program comes from a team of programmers, Paul Kudla and Andy Geist, located in Ontario, Canada working under the name of SuperCom Associates.

One purpose of a disk zap program is to allow the user to modify or repair parts of a program. The means to this end differentiate the various zap programs on the market. *CoCo Diskzap Utility* approaches the task by allowing the user to modify or repair portions of a specific sector of a disk or by calling up an individual file by its specific name.

The program, shipped on a protected disk, is written in machine language (except for a single line BASIC loader) and is totally memory resident, which provides the very fast reaction time to any command in the package; this speed is the reason the authors felt it was necessary to put a warning in the introduction. The program loads and automatically executes using either the BASIC loader line as provided for the purchaser who has the 1.0 Disk ROM or, for those with Version 1.1, just typing in `DOS` and pressing ENTER does the job.

There are several key features of this software package that set it apart from the run-of-the-mill zap programs. It can be configured to work on disks at 34 tracks or 40 tracks; it can be configured to work with double-sided or single-sided disks; the step rate may be set from six to 30 milliseconds; configuration patterns can be saved; automatically recognizes data address marks in a sector; has selectable sector offsets; needs as little as 16K; handles up to four drives on line; has an automatic repeat key; can be used to verify any sector(s) of the disk or the total disk; reads and displays a CoCo disk directory from within the program; has a fast format function; allows the user to fill any sector(s) with zero (Hex 00); copies specific sectors or the total disk to another disk or another area of the same disk; and produces a hardcopy of the information in specific sector(s) or the total disk both in ASCII and Hex, allowing for the selection of Baud rate for the printer.

The options can be called up from the main menu by simply using the arrow keys. Display and File Zap are the true work horses of the program.

The Display option allows individual sectors to be presented on the screen, and just by pressing the CLEAR key the screen will toggle between Hex or ASCII characters. When the user arrives at the changes, the 'M' key is pressed. This invokes a subsidiary routine to take over and the nibble under consideration appears in inverse video to alert the user to the location where the action will take place. The arrow keys move the highlighted area any place on the screen. When the program is operating under this modification option, it is a very critical time because of the speed at which changes are made. An error now might blow your disk in a wink.

Changes can be made in either ASCII or Hex notations from the keyboard. The program does only what the user requests, so the user is totally responsible for what happens to the disk under operation. For example, in the Hex mode, pressing the 'Z' puts zeroes from the current cursor position to the end of the page. Pressing the BREAK key aborts the action but pressing ENTER transfers the changes to disk. Needless to say, only those who know what they want to accomplish should attempt to use this very fast option.

The File Zap option is just as fast and powerful, and the same precautions should be followed. The file to be searched for or worked on is called up by name. It does not matter if the file was saved in BASIC, ASCII, or machine language, the program can read and display it on the screen. As in the Display option, changes to any nibble may be made from the keyboard.

Because the disk is copy protected, SuperCom Associates offers to replace for one year a program disk that does not work. After one year, replacements will be issued for the cost of the disk plus shipping and handling. The copy protection system used on the program disk may be part of a problem encountered with Version 1.0 of the program. Version 1.0 would not always load into CoCo with the 1.0 Disk ROM but would with units having the 1.1 Disk ROM; Version 2.0 has corrected the problem. Once loaded, both versions of the program worked as advertised on either CoCo.

Version 2.0 allows the user to select in what notation mode the user wishes to operate. Entries may be made in either hexadecimal or decimal notations, making the program easier to use for those whose native tongue is not Hex.

SuperCom Associates provides the program in a Radio Shack TRS-80 three-ring binder with an eight-page manual. The manual is produced on a daisy wheel printer and is very readable. Actually, the manual understates the program's abilities. *CoCo Diskzap Utility* has a "Hex" of lot to offer.

(SuperCom Associates, 449 Rougemount Drive, Pickering, Ontario, Canada L1W 2B8, disk $39.95 U.S.)

— Robert E. Foiles

One-Liner Contest Winner . . .

This one will create some nifty changing designs. It looks good on a Color Computer 3, as well.

The listing:

```
1 PMODE3,1:PCLS:FORQ=1TO99999:SC
REEN1,RND(2)-1:X=RND(256)-1:Y=RN
D(192)-1:H=RND(256)-1:V=RND(192)
-1:COLOR(RND(7))+1,1:LINE(H,V)-(
X,Y),PSET,BF:IFPEEK(345)=247THEN
RUN:ELSENEXT
```

Robert Rogers
West Palm Beach, FL

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

Power for the Little Guy: Seikosha SP-1000A Printer

In these times of fancy laserjet printers and super plotters capable of producing large and detailed blueprints, it is nice to know that someone is still thinking of us little guys. Most of us either cannot afford or have no need for such an item; however, we do need some method of getting text on paper. The Seikosha SP-1000A is a versatile printer which packs a lot of features at a more than reasonable price.

When I opened the box and had my first look at this printer, I was immediately reminded of the DMP-130 sold by Radio Shack. This was because of the SP-1000A's solid construction, paper-loading tray and front panel controls. The front panel controls give the user the ability to select or de-select near-letter-quality printing as well as set the left and right margins. However, the true test of any printer comes when you turn it on.

The SP-1000A is capable of printing pica, elite, condensed, proportional and italic fonts in several styles. These styles include bold, double-strike and double-width. The SP-1000A also fully supports subscript and superscript character modes. All standard margin, tab and printhead settings are controlled via control codes, as are underlining and unidirectional printing. The printer codes are what most people would call Epson compatible. For instance, one would issue a `PRINT#-2,CHR$(27);"SO"` to select the double-width style.

The SP-1000A also allows the user to select from foreign language fonts for printing. This is done either changing the DIP switches or by issuing the appropria control codes. Can your present printer print a tilde ov an 'n' without your having to program it to backspace firs

More important is the SP-1000A's ability to be pr grammed with your own character set. You can store speci characters in the 1.5K RAM of the printer and then u them to print characters specific to your own needs. The characters, called download characters, let technical peop print reports without having to pen in those stran characters by hand.

The user's manual is well-written. The control codes a summarized at the end of the manual and you may ref to specific pages to find more information on a specific cod This is the closest thing to an index. Along with eac control-code explanation the manual includes a program ming example. Although these examples were written f the IBM computers, most users should be able to conve them for the Color Computer quite easily.

The SP-1000A has a standard Centronics parall interface. Although it doesn't have a serial interface, it a simple matter to purchase and install a serial-to-parall converter. Cinsoft, who distributes this printer in the U.S also carries such a converter and is offering a package de for the printer and interface.

All in all, the Seikosha SP-1000A is an excellent buy. will more than meet the needs of almost every user. Wit its low price tag, the SP-1000A would make a good additio to nearly any computer system. This one gets four stars i my little black book.

(Distributed by Cinsoft, 2235 Losantiville Ave, Cincinnati, OH 45237, $209; $249 with interface)

— Cray Augsbur

100% Tandy Equipment with Full Warranty.

MicroWorld
&
MicroWorld II

230 Moorestown Rd.
Wind Gap, PA
18091
215-759-7662

Laneco Plaza
Clinton, NJ 08809
201-735-6777

Call For Price List

NEW COCO 3 and NEW TANDY 1000 AVAILABLE !!!

CALL FOR PRICING !!!

Drive 0 - $235
Drive 0&1 - $399
MultiPak - $70
DMP-105 - $159
DMP-130 - $275
SS Disks - $1

Prices Include Shipping.

See You At RainbowFest in Princeton !!

One-Liner Contest Winner . . .

This program draws a rainbow to help you get through those rainy days.

The listing:

```
1 PMODE3,1:PCLS:SCREEN1,1:FOR R=
60TO110STEP10:CIRCLE(128,192),R,
,.75:NEXTR:CIRCLE(208,40),20:FOR
 M=1TO3:READ X,C:DATA114,3,127,2
,140,4:PAINT(208,40),2,4:PAINT(1
28,X),C,4:NEXTM:FOR X=0TO1STEP0:
NEXT
```

James Butterworth III
Del Rio, TX

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape.*)

/iden Your Video Horizons With WordPak-RS

One of the longstanding complaints about the Color mputer has been its lack of an 80-column video display.

The WordPak-RS is a cartridge designed to plug into the ulti-Pak expansion interface (MPI) to give the user 80-lumn video on a monochrome monitor. The cartridge has RCA-type phono jack for the standard video output. It quires a 64K Color Computer and OS-9 Version 2.0.

The WordPak-RS features an 80-column by 24-line video splay with a full upper- and lowercase character set that s true lowercase descenders. It also features self-ntained video RAM and a programmable display format d cursor.

Installation of the WordPak-RS is relatively simple. The -column driver and descriptor on a backup of your OS-Config disk must be replaced with the driver/descriptor ir included with the WordPak. Then, use the Config utility create an OS-9 system disk with these files stored in the ot file. When you plug the WordPak in and boot OS-9, u will have an 80-column display.

This display works very well with OS-9. The upgrade to rsion 2.0 includes several changes that support 80-column deo. The `DIRectory` and `LIST` commands, as well as veral other utilities, have been altered to support the dened screen.

The WordPak-RS allows programmable display and rsor control. To accomplish such things as clearing the reen, inversing the video and complete cursor-movement ntrol, one need only use the OS-9 display command along th the codes supplied in the WordPak-RS manual.

The manual includes a wealth of information. In addition explaining some OS-9 theory and giving complete stallation instructions, the manual offers a great deal of chnical information dealing with the theory behind the ordPak-RS. This information, while not going overboard, ves an intermediate programmer enough background to rite his own character set. This can then be burned into standard 2716 EPROM and plugged into the WordPak.

I feel the WordPak-RS is an excellent product and would a welcome addition to any OS-9 user's Color Computer stem. While the price is a bit on the steep side, the pabilities of the WordPak-RS really shine and allow one get down to serious business. Once you have one, you on't know how you ever got along without it!

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, $99.95 plus $3 S/H)

— Vic Roberts

See You at
RAINBOWfest-Princeton
October 17-19

Speed Up the Action With Micro●Fire

Micro●Fire, a new device from Duck Productions, is a small circuit board that fits inside your joystick. Its purpose is to give you rapid-fire control of the firebutton.

The circuit board is small and holds a switch, a multi-turn potentiometer and an 8-pin IC, as well as a few support components. Installation is fairly easy. First, the board must be mounted in the joystick case. This is done by securing the switch through a hole you must drill in the case. Then make three or four quick soldering connections, put the joystick back together and enjoy the new capabilities of your joystick. I cannot think of any joystick for the Color Computer that this device would not work in. Mine was installed in a Radio Shack Deluxe joystick.

The installation manual is well-written and includes a listing for calibrating the rate of fire. The manual describes how to hook up the Micro●Fire to allow single-shot and rapid-fire techniques to be used in the same game without turning the Micro●Fire off.

As for action, Micro●Fire holds up to its promises. With an adjustable firing rate from 25 shots per minute to 900 shots per minute (most CoCo software will only recognize up to about 340 shots per minute) you shouldn't have to worry about the aliens again. Along with several other games (mostly space shoot-'em-ups), I tried the Micro●Fire with *Pegasus* from Radio Shack. Boy, it sure saved me from coming down with "joystick thumb."

Although Micro●Fire won't affect the fire rate on games that control the number of shots per time period via software, I think it is a worthy investment for any serious gamer.

(Duck Productions, 18 Rowe Court, Brampton, Ontario, Canada L6X 2S2, $19.95, $24.95 Cnd.)

— Ruth Graham

One-Liner Contest Winner . . .

Ribbon will generate some interesting designs. Give this one a `RUN`.

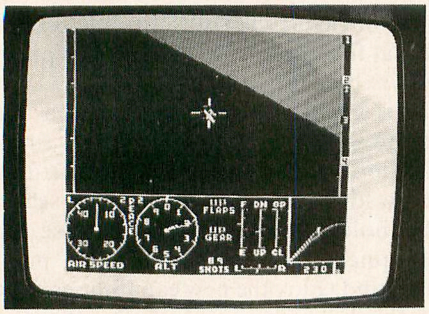
The listing:

```
0 PCLS:PMODE3,1:SCREEN1,1:PMODE4
:Z=34:Y=0:FORX=0TO1440STEP7.5:D=
X/57.295:S=COS(D)*57.295+Z:LINE(
S,Y+35)-(S,Y),PSET:Y=Y+1:Z=Z+1:N
EXT:GOTO0
```

Charles P. Maulick
Staten Island, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape.*)

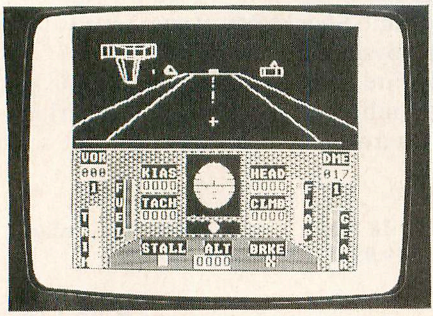
TOM MIX'S MINI-CATALOG



P-51 Mustang Attack/Flight Simulation

The ultimate video experience! Link two CoCo's together by cable or modem, and compete against your opponent across the table OR across the country! (Both computers require a copy of this program). The P-51 flight simulator lets you fly this WWII attack fighter in actual combat situations—against another player OR against the computer.

32K Machine Language
Flight Manual Included
Tape $29.95 Disk $34.95



Worlds of Flight Small Plane Simulation

Real-time simulation generates panoramic 3-D views of ground features as you fly your sophisticated plane in any of nine different "worlds." Program models over 35 different aircraft/flight parameters. Realistic sound effects too! Manual included helps you through a typical short flight.

32K Machine Language
Flight Manual Included
Joysticks Required
Tape $29.95 Disk $34.95

Educational Best-Sellers!

Teachers Database II—Allows teachers to keep computerized files of students. Recently updated with many new features!

- Up to 100 students, 24 items per student
- Many easy-to-follow menus
- Records can be changed, deleted, combined
- Statistical analysis of scores
- Grades can be weighed, averaged, percentaged
- Individual progress reports
- Student seating charts
- Test result graphs/grade distribution charts

64K TDBII $59.95 Disk Only
32K TDBI $42.95 Tape $39.95

NOW AVAILABLE FOR IBM PC & COMPATIBLES-Holds information on up to 250 students with as many as 60 individual items of data for each. Contains the features listed above PLUS.

Requires 128K - $89.95

Factpack—Three programs for home or school use provide drill and practice with basic "-/+/÷/x" Grades 1-6.

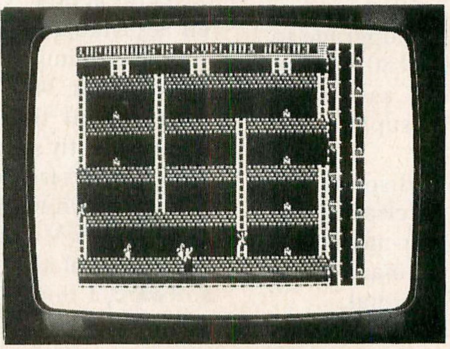
32K Ext. Basic
Tape $24.95 Disk $29.95

Vocabulary Management System—Helps children learn and practice using vocabulary and spelling words. Eleven programs including three printer segments for tests, puzzles, worksheets and five games; many features make this a popular seller!

Requires 16K Ext. Basic/
32K for Printer Output
Tape $39.95 Disk $42.95

Fractions—A Three-Program Package. 1/Mixed & Improper 2/Equivalence 3/Lowest Terms. Practice, review and definitions make learning easy.

32K Ext. Basic
Tape $30.95 Disk $35.95



NEW RELEASE
GOLD FINDER

Here's the quality you have come to expect from TOM MIX. Another outstanding color computer game. This one ranks right up there with "Donkey Kong". Listen to this: 69 levels for one or two players PLUS you can create your own levels (up to 306 on a disk). Endless possibilities await you in this exciting new creation. Move over Goldrunner and Loderunner, here comes GOLD FINDER. . .

32K & Joysticks Required
Disk $27.95

Unique Utilities!

New! Use the tools we've used to create "Donkey King," "Sailor Man" and others!

- Full use of 64K RAM
- 100% Machine Language
- No ROM Calls
- Selectable Drive
- Support 1-4 drives
- Menu Selected functions
- "Cold Start" exit to Basic
- Parameters easily changeable in basic loader

MAS Assembler—the finest ever! (Includes EDT)

Disk $74.95

EDT—Effortless full screen editing w/2-way cursor. Text files to 48K+. Copy, save, move, delete, print blocks, much more!

Disk $39.95

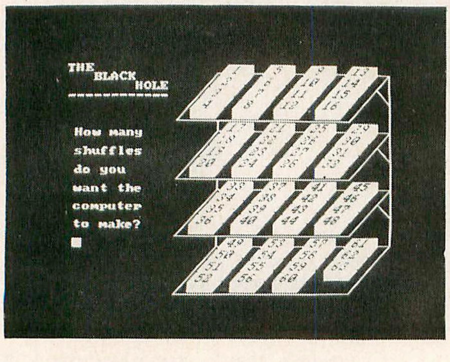
Deputy Inspector—Alphabetize, resort and backup directory; fast 3-swap backups, copy files or programs, auto-reallocate granules during backup for faster loading, more!

Disk $21.95

Sector Inspector—Alphabetize, backup and print directory; repair crashes, LLIST basic programs, read in and edit 23+ grans, much more!

Disk $29.95

We Have More Software Available Than Listed Here. Please Write for a Free Catalog!



THE BLACK HOLE

How many shuffles do you want the computer to make?

NEW RELEASE
THE BLACK HOLE

For anyone who enjoys solving a challenging logical puzzle, here is a 3-dimensional puzzle composed of 63 numbered cubes in a 4 by 4 by 4 array that leaves one BLACK HOLE. You tell the computer to sort the cubes and the computer tells you to put them in numerical order. A real brain bender. Outstanding color and action. Years of entertainment. . .

For IBM PC & Compatibles
$24.95

More Tandy-IBM/PC software available.

TM

TOM MIX SOFTWARE
P.O. Box 201
Ada, Michigan 49301
616/957-0444

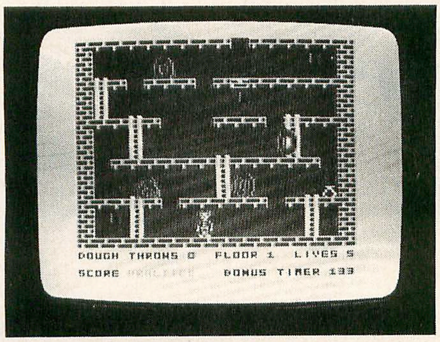
Ordering Information

- Call us at 616/957-0444 for Charge Card orders
- Add $3.00 postage and handling
- MI residents add 4% sales tax
- Authors—We pay top royalties!

MasterCard
VISA®

Look What's New at NOVASOFT!

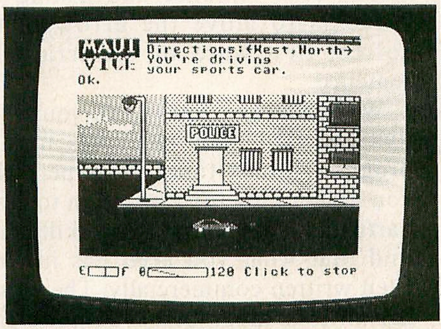
Top-quality software at affordable prices, written by well-known authors in 6809 Machine Language


DOUGH THROWS 0 FLOOR 1 LIVES 5
SCORE BONUS TIMER 133

NEW RELEASE
DONUT DILEMMA

Angry Angelo has raided Antonio's Donut Factory sending the entire complex amuck! Donuts have come alive and all the machines are out of control. You must reach floor 10, past the Fat Spurters, Cream Blasters and Berserk Bucket to name a few, and deactivate the power generator to restore law and order. But hurry! Time is running out!

Requires 32K
Tape $21.95 Disk $24.95


MAUI VICE
Directions:<West,North>
You're driving your sports car.
Ok.
POLICE
F 0 120 Click to stop

Maui Vice

Step into the shoes of Crockett & Tubbs, and gather evidence, photographs and witnesses to convict your suspects! With "windows" to select your options, hi-res graphics, and a new story generated each time you play. This is state-of-the-art that guarantees excitement and newness every time you play.

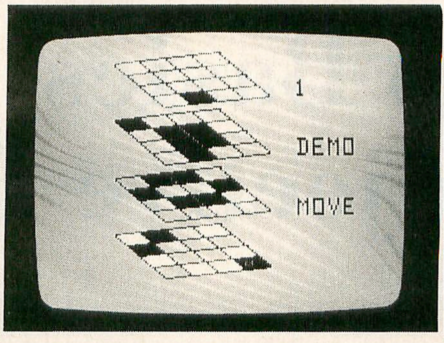
64K Ext. Basic & Joystick Required
Tape $18.95 Disk $21.95

Other Best Sellers

The Misadventures of Eddie—Eddie is roaming through time creating havoc-and you must bring him home! Over 140 locations, 50+ commands, hi-res grapic adventure. 64K Disk $21.95

Brewmaster—Move along the end of the bars, serving beer to your thirsty customers. Fast-paced action. 32K & Joystick.
Tape $14.95 Disk $17.95

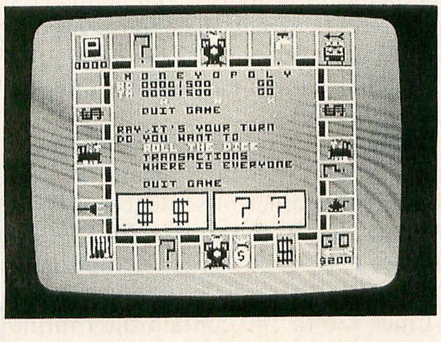
Martian Crypt—Life once existed on Mars! Find the hidden Martian crypt. Animated hi-res graphic adventure with sound effects.
32K Tape $18.95 Disk $21.95



NEW RELEASE
FOURCUBE

Now you can play TIC-TAC-TOE in 3D. The board consists of a 4x4x4 grid of cells. Pit your wits against the computer with six levels of difficulty or against your favorite opponent. Sound easy? Try it and you'll agree with us when we say its a "real challenge".

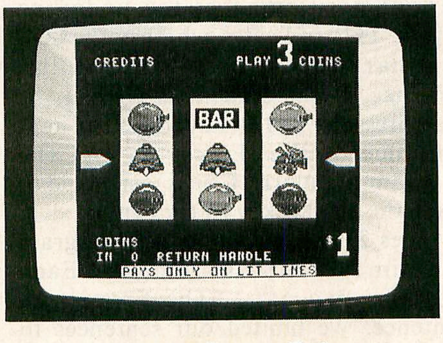
Requires 32K 1 or 2 Players
Tape $15.95 Disk $18.95


MONEYOPOLY
QUIT GAME
RAY, IT'S YOUR TURN
DO YOU WANT TO
ROLL THE DICE
TRANSACTIONS
WHERE IS EVERYONE
QUIT GAME
GO $200

Moneyopoly

Play the popular board game on one of the most realistic computer game simulations ever! Contains all the features of the original. Buy, sell, rent, wheel & deal your way to fortune.

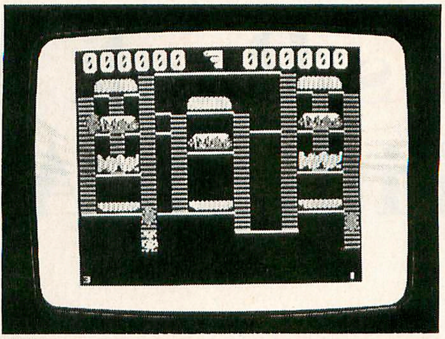
32K Joystick Required
Tape $19.95 Disk $22.95


CREDITS
PLAY 3 COINS
BAR
COINS IN 0 RETURN HANDLE
$1
PAYS ONLY ON LIT LINES

Vegas Game Pak

Six games in all! Blackjack, Keno, Video Poker & 3 slot machine lookalikes. Super graphics!

16K Ext. Basic Required
Tape $24.95 Disk $27.95


000000 7 000000

NEW RELEASE
LUNCHTIME

Your chef, Peter Pepper, is surrounded! Dodge pickles, hot dogs, and eggs while building hamburgers. This high res game features 7 difficult levels of wild entertainment. Fast paced action for either one or two players. Have a Burger Time. . .

Requires 32K & Joysticks
Tape $18.95 Disk $21.95

Tom Mix Products at New Reduced Prices!

Sailor Man—Defeat the bigfatbadguy and win Elsie's heart. Super graphics.
64K Tape $24.95 Disk $27.95

Dragon Slayer—Defeat the dragon by finding your way through a mountain maze. Gather treasure but avoid the deadly traps! 160 exciting screens.
32K & Joystick or Keyboard
Disk $24.95

The King—
32K Tape $24.95 Disk $27.95

Draconian—
32K Tape $19.95 Disk $22.95

Ms. Maze—
32K Tape $19.95 Disk $22.95

Kater Pillar II—
16K Tape $19.95 Disk $22.95

Warehouse Mutants—
16K Tape $18.95 Disk $21.95

Buzzard Bait—
32K Tape $19.95 Disk $22.95

NOVASOFT
A Tom Mix Company
P.O. Box 201
Ada, Michigan 49301
616/957-0444

Ordering Information

- Add $3 shipping/handling
- MI residents add 4% sales tax
- Dealers welcome
- Many more titles—write for free catalog!

Credit Card Orders

Call 616/957-0444

MasterCard VISA®

EDUCATION NOTES

16K
ECB

It's Back to Basics With an Adjective Review

By Steve Blyn
Rainbow Contributing Editor

This month's article presents a grammar review program. It is suitable for a review of any part of speech within a sentence. We have chosen to illustrate with a review of adjectives.

Grammar is making a comeback in education. For many years, in the not too distant past, it was felt that by stressing grammar, student creativity would be stifled. Grammar was put on the back burner. Therefore, many students were educated with very weak skills in grammar. This deficiency came back to haunt them later in life. Colleges, especially, complained of poor basic writing skills of many entering freshmen.

The back-to-basics movement we have witnessed in the past few years includes and even stresses grammar. Correct grammatical usage is again part of most school systems' curricula. Our program helps to review parts of speech.

We chose adjectives as an example of the way to use this program. A sentence appears on the screen. An arrow appears underneath the first letter of the first word in this sentence. The student uses the right-arrow key to move the arrow underneath the first letter in the word which is the adjective.

Pressing the ENTER key indicates whether this is indeed the sentence's adjective. If correct, the child proceeds to the next sentence. If incorrect, the child repeats the same sentence until he guesses correctly.

There are 10 sentences in this program. You may have as many as you want. The number of sentences is indicated in Line 30 as variable 'N'. Line 60 chooses one of the sentences randomly and Line 110 prints it on the screen.

Lines 130 to 180 contain the routine to move the arrow. The arrow is displayed by using `CHR$45`. Line 150 erases the arrow and moves it to the right whenever the right-arrow key is pressed. Line 160 does the same to the left. When `CHR$ 13` (the ENTER key) is pressed, the program jumps down to Line 190.

Lines 190 to 210 check the student's current positioning of the underline arrow. This indicates whether the student has selected the adjective in this sentence. If the student is correct, he may press the ENTER key to get the next sentence or the 'E' key to end the program. If incorrect, he is instructed to press the ENTER key to try again.

Lines 280 to the end of the program contain the `DATA` statements. Each contains two parts. The first is the sentence. We limited our sentences to under 32 characters to allow them to fit on one line. You do not have to stick to this idea. It does, however, make for a neater screen display. The second part of the `DATA` line is the number of characters counted until the place where the first letter of the adjective occurs in the sentence.

This program is easily modifiable for nouns, verbs, pronouns, adverbs or any part of speech you want to test. We even tried a version with scrambling the words of a sentence and asking the students to move the arrow to the correct first word of the scrambled sentence.

We encourage you to use your creativity to find additional uses for this program. Many times it happens that you are looking for a program to cover particular subject areas or skills. You find that what you need has just not been written commercially. The reason for this is most often a marketing decision. It is not worth the time, effort and cost to a software company to produce a program that has limited appeal. The programs appearing in these monthly columns are meant to be modified to fit particular needs. They are written so that some simple modifications can be performed by those who do not know how to program.

You could work on this *Adjective Review* and turn it into a Noun, Verb, Adverb, Etc., Review, save each version, and eventually cover all parts of speech. Modifications are meant to be done on many of the programs that appear in this column. We encourage you to do so. You can develop a personal library of educational programs that focus on skills for your needs. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: `ADJECTIV`

```
10 REM"GRAMMAR REVIEW-ADJECTIVES
"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1986"
30 N=10
40 DIM A$(N),A(N)
50 FOR T=1 TO N:READ A$(T),A(T):
 NEXT T
60 R=RND(N)
70 CLS
80 PRINT@40,"adjective review";
90 PRINT@72,STRING$(16,255);
100 H=224
110 PRINT@192,A$(R);
120 PRINT@H,CHR$(45);
130 EN$=INKEY$
140 IF EN$=CHR$(13) THEN 190
150 IF EN$=CHR$(9) THEN PRINT@H,
CHR$(143);:PRINT@H+1,CHR$(45);:H
=H+1
160 IF EN$=CHR$(8) THEN PRINT@H,
CHR$(143);:PRINT@H-1,CHR$(45);:H
=H-1
170 PRINT@192,A$(R);
180 GOTO 130
190 G=H-223
200 IF G=A(R) THEN 220
210 IF G<>A(R) THEN 250
220 PRINT@364,"CORRECT";:PLAY"O4
L100CDEFGECCCC":PRINT@422,"PRESS
 ENTER TO GO ON";
230 EN$=INKEY$
240 IF EN$=CHR$(13) THEN RUN ELS
E IF EN$="E" THEN END ELSE 230
250 PLAY"O2L20BB":PRINT@355,"PRE
SS ENTER TO TRY AGAIN";
260 EN$=INKEY$
270 IF EN$=CHR$(13) THEN 70 ELSE
 260
280 DATA SHE IS A BIG GIRL.,10
290 DATA HE WENT TO THE GROCERY
STORE.,16
300 DATA DAVID ATE A CHOCOLATE C
OOKIE.,13
310 DATA THE FAT CAT SAT DOWN SL
OWLY.,5
320 DATA MY FRIENDLY DOG'S NAME
IS SPOT.,4
330 DATA WE WENT TO SEE A SCARY
MOVIE.,18
340 DATA I ATE THE SWEET PEACH Q
UICKLY.,11
350 DATA CAN YOU DRAW A PRETTY P
ICTURE?,16
360 DATA WHERE IS MY BIG BOOK NO
W?,13
370 DATA THE HEAVY DOOR CREAKED
NOISILY.,5
```

One-Liner Contest Winner . . .

This one-liner will flip any previously loaded or drawn `PMODE` 3 or 4 picture upside-down. This is one of those programs that is good to study for technique.

The listing:

```
10 DIMA(10),B(10):PMODE4,1:SCREE
N1,1:FORY=0TO95:GET(0,Y)-(255,Y)
,A,G:GET(0,191-Y)-(255,191-Y),B,
G:PUT(0,Y)-(255,Y),B,PSET:PUT(0,
191-Y)-(255,191-Y),A,PSET:NEXTY:
FORD=1TO99999:NEXT
```

Mike Hall
Hartland, WI

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

One-Liner Contest Winner . . .

This program displays designs created by the rotation of a line about a fixed point on the line while the point undergoes simple harmonic translation in a horizontal direction.

(Editor's Note: After a mouthful like that, the least you can do is give it a try!)

The listing:

```
1 PMODE4:SCREEN1,1:PCLS:P=RND(10
)/10:T=RND(360)/57.3:R=RND(8)/4:
FORN=1TO60:V=128+47*SIN(N/9.55):
T=T+R/9.55:W=V-80*(1-P)*COS(T):X
=96-80*(1-P)*SIN(T):Y=V+80*P*COS
(T):Z=96+80*P*SIN(T):LINE(W,X)-(
Y,Z),PSET:NEXT:FORI=1TO2000:NEXT
:GOTO1
```

Steve Halko
Corrales, NM

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

Command Options in the Workspace

By Cray Augsburg
Rainbow's CoCo SIGop
Username: RAINBOWMAG

Last month we discussed some of the commands in the workspace area. We also covered the proper method for uploading files to Delphi. This month we'll continue our discussion of the remaining workspace commands. Take a look at the table of commands. These are the commands available in your Delphi workspace.

Submitting Files

We've already discussed the procedure for uploading files, but how do you go about giving them to the system so other users can download them? This is accomplished with the SUBMIT command. Once you have uploaded your file, type SUBMIT and press ENTER. Delphi asks if the file to be submitted is in your workspace and if you want to continue. Enter Y for yes. Then you are asked how many files you want to submit. It is best to use only the number of files you want to put together in one group. If you answer with more than one, Delphi asks if the files are to be put together as a group.

Next, you are prompted for the file type. Options include program, article, documentation, data and miscellaneous text. Delphi then asks to which database you want to submit the file(s). Enter the first three characters of the appropriate topic.

If you are submitting more than one file at a time, Delphi asks you to enter how you want the group named in the public database. You can use up to 32 characters and use of this many is advisable, as it helps clarify your group.

Next, enter a description of the file(s). Please include all pertinent information in this description. We would like to see addresses with machine language files, required POKES with BASIC files, system requirements for all programs and loading information for graphics and music. This is to help others as they try to download and enjoy your creations.

Once the complete description is entered, press CONTROL 'Z' to escape to the keyword prompt. If you enter a question mark here you will see what the required primary keyword choices are. Pick the most appropriate and then add others of your choice. After entering the keywords, you are asked for the workspace filename. Then you have the option of entering a special filename if the file absolutely requires one once it has been downloaded (i.e., another file in the group needs to refer to or call the file in question).

Then you are asked for the display name. If only submitting one file, the display name is also the name the public

---

Cray Augsburg is RAINBOW's technical assistant and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is RAINBOWMAG.

ses to find the file and, therefore, it llows up to 32 characters. Finally, elphi asks if the submitted file(s) are o be deleted from your workspace.

> *". . . the Common area is a place for individual users to offer things to other users."*

That's all there is to it. You have just submitted a file for CoCo SIG members to download, use and enjoy. From here, the file goes to the preview area where it will be downloaded and checked for errors by one of the database elves. If all goes well, we'll send a mail message to let you know your file has been accepted for the public database.

Now, just to confuse things, look at the table again. There is a command called `PUBLISH`. Sounds like it might do the same thing as `SUBMIT`, huh? Well, it does. You can use `SUBMIT` and `PUBLISH` interchangeably. Try these commands. We are more than happy to have submissions from all CoCo SIG members.

Table of Commands

```
APPEND
CATALOG
COMMON
COPY
CREATE
DELETE
DOWNLOAD
EDIT
EXIT
HELP
HOME
LIST
PUBLISH
PURGE
RENAME
SETTINGS
SUBMIT
UNPROTECT
UPLOAD
XUPLOAD
XDOWNLOAD
KUPLOAD
KDOWNLOAD
KERMIT
```

On to Other Commands

Let's try a little experiment. Use `CREATE` to build two separate short text files online. Call one of them TEST.1 and the other TEST.2. Now, type:

```
APPEND TEST.2 TEST.1
```

and press ENTER. This merges TEST.2 onto the tail end of TEST.1, thereby altering TEST.1. TEST.2 remains unchanged in your workspace.

`CATALOG` is another useful command. Try it. Does the result look familiar? It should, as the `CATALOG` command functions identically to the `DIRECTORY` command. Use whichever one you feel most comfortable with. You can use `RENAME` to change the filenames in your workspace area. This sure is a handy command to have around when you need it.

The `SETTINGS` command allows a user to change default settings as well as important technical information about how files will be transmitted. This command alleviates the need to go all the way back to the main menu to set your password or terminal width.

Now we come to the `UNPROTECT` command. It is advisable *not* to experiment with this command. All mail and user default files are stored in your workspace. They are in a protected form. This means you cannot inadvertently delete these specific files when playing around in workspace. However, if you `UNPROTECT` a file, it is fair game to any typing errors. Please be careful with this command. If you need to delete mail, the best way to do it is to go to Mail and delete your messages there. Be forwarned about `UNPROTECT`.

The `EXIT` command takes you out of workspace and returns you to the previous prompt. It accomplishes the same thing as CONTROL 'Z'.

The Common Area

As its name implies, the Common area is a place for individual users to offer things to other users. It can be used to transfer a text file to a friend or for just about anything. To get to the Common area just enter `COMMON` at the workspace prompt. You are then told

When You Own A

COLORCHESTRA™ MIDI SEQUENCER

All Of A Sudden, Synthesized Music Production Becomes Very, Very Simple.

COLORCHESTRA, (from the author of CoCo MIDI), links together your Tandy 64K Color Computer and MIDI equipped keyboard synthesizer or rhythm drum machine and makes it simple to create masterpieces of music.

By incorporating menus and graphic icons, all there is to recording in real time is pushing a few keys.

Once the track is entered, auto correction, transposing, and filtering may be implemented. And **COLORCHESTRA™** works with you to record up to **8,000 notes** utilizing as many as **16 tracks**...awesome.

But it doesn't stop here - **COLORCHESTRA™** is crammed with a myriad of other outstanding professional features...

- ✓ Solo capabilities on any track
- ✓ Tempo range from 30-250 beats per minute.
- ✓ Audible and visual metronome
- ✓ Programmable measure locator
- ✓ Sequencer will record from any MIDI Channel (1-16)
- ✓ Each track can output to any MIDI Channel (1-16)
- ✓ Records full spectrum of MIDI data including program changes, pitch bends, all 128 MIDI controllers (modulation wheel, breath controller, sustain pedal, etc.)
- ✓ Will sync to drum machines
- ✓ MIDI thru on input
- ✓ Programmable time signature
- ✓ Real time velocity modification
- ✓ All 16 tracks can be titled
- ✓ Software filter removes specific MIDI parameters from recorded music such as pitch bend, program, change, velocity data, modulation wheel, MIDI controller
- ✓ Transposition of notes up or down any number of octaves in half steps
- ✓ Auto correct feature for timing errors
- ✓ Stores composed music on tape or diskette
- ✓ Works with any disk operating system (Radio Shack, JDOS, ADOS, etc.)

COLORCHESTRA™ system complete - $149.95. Call any day (ex. Sun.) to order. We ship same day. We accept check, COD, Visa, Master Card. Shipping add $3.00, COD add $2.00

COLORCHESTRA Copyright 1985 C.W. Lanusse III.

HORIZON
SOFTWARE CORPORATION

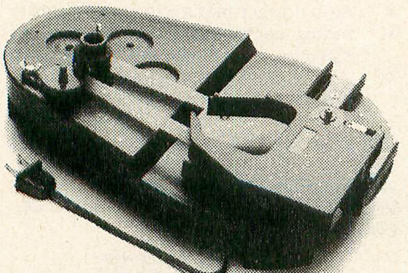
318-942-1938 P.O. Box 289
Opelousas, Louisiana 70570

The Universal MacInker(s)(TM) are here

Re-ink any Fabric ribbon automatically for less than

5¢

Now one **Universal Cartridge MacInker (UC)** re-inks all fabric cartridges and one **Universal Spool MacInker (US)** re-inks all spools. We have **MacInker(s)** dedicated to specialized cartridges, zip pack, harmonica etc. Over 1000 printer brands supported. Use your **MacInker** to re-ink your dry, fabric cartridges (for less than 5 cents in ink) and watch the improvement in print-out quality. Our new, residue-less, lubricated, dot matrix ink yields a darker print than most new ribbons. Or get any of our basic ink colors: brown, blue, red, green, yellow, purple and use **MacInker** to **create and/or Re-ink your own colored cartridges.** We have uninked or colored cartridges for the popular printers and ribbon re-loads for any printer. Operation is extremely simple & automatic with new, twin drive electric motor that supports CW and CCW rotating cartridges. A good quality fabric ribbon of average length can be re-inked almost indefinitely. In our tests one re-inked Epson* 80 ribbon has outlived the estimated life of the print-head!! We receive consistent & similar feedback from our customers. As of August 85 we have over 40,000 MAC INKER(s) in the field, in 5 continents (220 V motors available). **MacInker (UC) is $60.00.** Cartridge drivers are **$8.50/ea.** We still have our first generation, dedicated **MacInker(s)** for most popular printers. Prices start at **$54.95** with most units below $60.00. **MacInker** has been reviewed, approved and flattered in most magazines and even in the NEW YORK TIMES and the CHICAGO SUN TIMES.



Universal Cartridge Mac Inker

Computer Friends

6415 S.W. Canyon Ct.
Portland, OR 97221
(503) 297-2321

Order toll free 1-800-547-3303
or ask for free detailed brochure.
Dealers inquiries welcome.

*EPSON is a trademark of EPSON CORP.

you are entering the Common area. To get back to your individual workspace, just enter `HOME` and you'll be there.

To copy a file from the Common area to your own workspace for later perusal, use the `COPY` command. An example would be:

```
COPY   fileto.get   HOME:newfile
```

To copy a file from your workspace to the common area, enter:

```
COPY   HOME:fileto.go   newfile
```

Notice the use of `HOME:` in the above examples. It is used to transfer files between your workspace and the Common area. The first filename is always the file to transfer and the second name corresponds to what the filename will be once the file is transferred.

`COPY` can also be used within your individual workspace to create multiple copies of a file. This comes in handy when you're altering or editing a file, but also want to keep a copy of the original.

Aside from the Kermit-specific commands, we have covered about everything you will meet in workspace. W won't devote any time to Kermit, as i is not yet supported on the CoCo. W might, however, see something in th not too distant future. Who knows Maybe you'll be the one to implemen it on the Color Computer. The specifications files are in the database.

Conference

As you can imagine, things have bee buzzing on our CoCo SIG since th announcement of the Color Compute 3 on July 30. That evening, severa people joined in a conference led b **Steve Bjork** (6809ER) to discuss th new machine. There were over 30 people in attendance. We heard the Unine and Tymnet V3035 ports were all full It was taking people forever to ge online. We're sorry if you missed th conference, but you can find out more information now by staying tuned to th CoCo SIG.

Unfortunately, one of the people wh was unable to attend the conference was **Jim Reed** (JIMREED), our CoCo SIG Manager. I say "unfortunately" — Jim

DATABASE REPORT

By Marty Goodman

The biggest news in the Delphi database is the arrival of **Dale Lear** (DALELEAR) as our new OS-9 database section leader. Dale replaces **Steve Bjork**, who will still be checking in regularly. Dale is known to CoCo users as the author of the *Baseball* and *Doubleback* ROM packs, and as the author of *DL LOGO*, a full and powerful LOGO implementation under OS-9 (considerably more elaborate than the Radio Shack disk or Program Pak versions released three years ago). Dale has been using OS-9 since its release for the Color Computer, and was among the first developers of Tandy OS-9-based CoCo software. He also does consulting work relating to UNIX systems. Dale is quite knowledgeable about the details of the CoCo 3. We warmly welcome him to the Delphi family. Look for him on the SIG!

The next biggest news here is the explosion of our Music database. All of these are *Musica 2* files, which can be downloaded using Xmodem and made to play using the *Play* utility available in the Music data library. **Richard P. Trasborg** (TRAS) started us off with Kool, and **Cray Augsburg** (RAINBOWMAG) contributed the **Scott Lampton** Transcriptions. Then **Ned Smith** (NEDSM) contributed *Axel Foley*. **Tom King** (CAPNCRUNCH) gave us no fewer than 25 tunes, and **George McCashin** (GMCC) gave us *BACH 184.MUS*. **Allan H. Smith** (LUTHER) gave us two popular tunes (*Wake Me Before You Go* and *Say You're Wrong*) and **Stephen Scherock** (SFSCHEROCK) then gave us a dozen more titles. **Scott Milliken** (IDIOT) recently gave us *Idiosyncrasies*, and is soon to send us quite a number more. One member just spoke to me about uploading a library of Grateful Dead transcriptions. We seek more files to speed this rapidly growing database on its way.

In the General topic area, Cray Augsburg has given us a quick introduction to the new commands under Disk Extended Color BASIC 2.1 available on the CoCo 3. I will soon be adding material to the General and Hardware Hacking sections providing new information on our new machine. In the Utilities section **Robert Pierce** (RPIERCE) has given us a memory editor to view and alter CoCo memory locations. **Mike Lucash** (MIKELUCASH) has provided a utility to convert ML programs to data statements to facilitate easy inclusion into BASIC programs. He has also given us a disk zap program. **Mark O'Pella** (MDODELwas in New York covering the announcement. While he was busy phoning in news reports to us, it was all we could do to stand still, eagerly awaiting his arrival back here so we could look at the many pictures he took. The lucky guy got to see the thing before we did!

The conference was a smashing success. Most people who had questions got them answered, while others sat back and digested all the information. There were very few hitches and all went smoothly. Soon, you will see here a guideline on holding scheduled conferences.

If you haven't already done so, check out the many new files in the database covering the Color Computer 3. The files are very informative and will give you some insight into the powerful capabilities of the new machine. Also, check elsewhere in this issue for some example programs by our very own **Dale Lear** (DALELEAR). Dale is our OS-9 database section-leader and is also a programmer who has been working with the Color Computer 3. We are very fortunate to have him with us and we look forward to many more great things from him. ☐

PHI) has given us a disk directory sort program and **Rodger Alexander** (SALZARD) has given us *TESTMAKER.PBJ*, a utility to facilitate the creation of Y/N, matching and essay question tests, written to support the full 80-column display capability of the PBJ Wordpak. It is likely that minor modifications of it will run in the 80-column mode on the CoCo 3. **Stephen Macri** (DRACMAN) uploaded *OSCAR.BAS* (to calculate the orbit of several Ham radio OSCAR satellites). He has also given us *Dates* and *Calendar*, calendar utilities. These use Steve Bjork's mouse software. **Loren J. Howell** (XENOS) gives us a recipe program, and from **Eric Tilenius** (TILENIUS) comes a logarithm table creator, and an envelope addresser.

In the Games topic area, we have received *Miner* from Mike Lucash, and a nuclear plan simulator from **Robert Matthews** (BOBMATTHEWS).

Our Data Communications topic area has been enhanced by *Disk Fone Send* from Mike Lucash, a utility to send an entire disk over the telephone via modem. **Greg Miller** (GREGMILLER, co-author of *McPaint*) has also provided his disk-to-disk terminal transfer utility, which supports sending disk at up to 1200 Baud via the "bit-banger" port from one CoCo to another. Stephen Scherock has sent us a *Mikeyterm* utility, *MTSTART*, to set up *Mikeyterm* for different log ons. He has also contributed *Teleterm* Version 1.32. **Jim Lalone** (TERMITE) has given a dialer utility.

In the Graphics section, I am starting to put up issues of the "CoCo Gallery" for you to download and enjoy. We have received a font editor from **Ken Schunk** (KENSCHUNK), and a Dolly Parton Picture from Richard Trasborg. Mark O'Pella uploaded a random art generator, and **Ira Goldwyn** (IRAG) has shared a few more of his pictures. Loren J. Howell has sent an animated fire picture, and **Steve Dale** (MARINER1) contributed a rock video image. **Ken Bragg** (KILRCOCO) has sent *LEGEND.DRV* and **Derrik M. Kardos** (DTG) has given an image of the starship enterprise.

In the OS-9 Database, where Dale Lear will soon be assuming his duties, Steve Bjork has provided several versions of his bouncing ball demos. **Robert Wuest** (WUEST) has uploaded a system utility for sending memory modules to standard output, and a calendar program. THE RAINBOW's "KISSable OS-9" material is now available for download in the OS-9 database (at a $3.50 surcharge for the group as a whole).

With the arrival of the CoCo 3, look for definitive coverage on its hardware and software aspects here on the Delphi CoCo SIG. Soon, I hope to have completed an exhaustive file describing the reasons for some CoCo 2/CoCo 3 software incompatibilities, and how to overcome them, as well as a discussion of the GIME chip. I also expect to be posting some interfaceless RTTY software for the Color Computer. This was written by the authors of *Graphicom* and *WEFAX*. This last will appear in the Data Communications section. As OS-9 support for the CoCo 2 and CoCo 3 grows, we expect to greatly expand our OS-9 section. Stay tuned.

See you on Delphi!

— Marty
(MARTYGOODMAN)
Delphi CoCo SIG Database Manager

PSYCHO 1

PSYCHO 1 is an integrated package of 8 basic programs in hi-res. used as classic exercices for use in a laboratory of psychology or just for fun. These programs are user friendly, menu driven and in French, English and Spanish.

Programs: ILLUSION, OBSERVER, REACTION, PYRAMIDE, MEMOIRE, SERIES, OPTIQUE, FECHNER.

Requires: 64K, 1 disk drive
Catalog number: 02-600-RM
ONLY FOR 34.00$ US 45.00$ CAN

RAINBOW

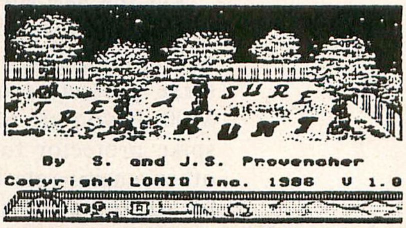
LEOS

Explore the caverns aboard a tank and defend yourself from attacking mutants (The LEOS). Arms and fuel are available but you must leave your vehicule to get them... Those LEOS make this game a real challenge.

Requires: 64K, 1 joystick
Disk: 26.95$ US 35.95$ CAN
Tape: 24.00$ US 32.00$ CAN

RAINBOW
03-100-RA

Version	Disk	Tape
English	03-100-RA	03-100-CA
French	03-100-RF	03-100-CF



A 64K graphics adventure game on disk that places you in the role of a treasure hunter in a city area looking for familiar objects. Bring them back to your girlfriend in the allowed time is not always easy. If you enjoy the challenges, this game is for you.

Requires: 64K, 1 disk drive.
PRICE: 28.95$ US 38.95$ CAN

RAINBOW
01-100-RA

01-100-RA	Treasure hunt
01-100-RF	La course aux trésors
01-100-RE	La caza del tesoro

Order our free catalog

WHEN ORDERING
- Add 2.00$ CAN or 1.50$ US for S/H
- Quebec residents add 9% sales tax
- Certified checks; money orders; personal checks (2 weeks delay).

ALL OUR SOFTWARE IS SHIPPED...
in a durable protective vinyl album for handy storage.

LOMIQ
c.p 105, succursale A.
Jonquière, Québec, Canada, G7X 7V8

Protect your valuable equipment from power spikes with . . .

The Shock Absorber

By Marty Goodman

Power line surge and spike protectors come in all types and prices. Few people who buy them are aware of the considerable differences in quality among the various products. Some consist merely of a few capacitors across the power line. Some have a single metal oxide varistor (MOV) across the incoming AC line. Slightly better ones have three MOVs running across the two main incoming AC lines and go from each of those lines to ground. Some even add a fuse.

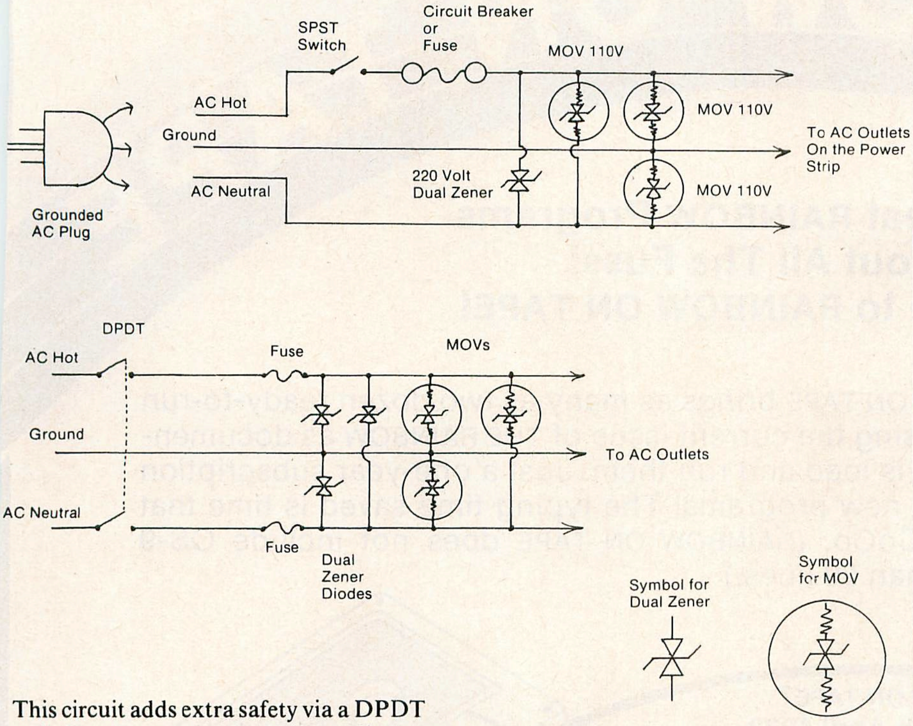
But the *best* surge and spike protectors use dual zener diodes in addition to MOVs and fuses. Such high-quality spike protectors often sell for $50 to $100. If you are interested in buying a spike protector for your computer or other sensitive electronic device, be sure to ask the seller if it uses dual zener diodes. If it does not, or if the seller is in the least bit unsure, do not waste your money on the item.

MOVs and dual zener diodes function in a similar fashion. Both are devices that behave as insulators until the voltage across them exceeds a certain preset value. After that, both of them become conductors. Thus, both are used across power lines where a potential short may occur. MOVs differ from zeners in that they are about 10 times slower to respond to a voltage surge, and when they get overloaded they burn out to an open circuit condition (thereby ceasing to provide any protection). Zener diodes respond far more rapidly than MOVs, but when they are overloaded they often fuse to a closed circuit (shorted) condition. Zener diodes clip ultra-fast voltage spikes down to size. MOVs are nice to have because they kick in later and relieve the stress on the zener. Fuses should always be in series with any dual zener diodes you use, so that if the voltage spike persists, causing the zener to short out permanently, the fuse then blows, preventing a fire hazard. There you have the three elements of a quality spike and surge protector: a fuse, a dual zener diode and MOVs.

I've built a number of spike protectors for my equipment at home. I start

---

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW'S *CoCo SIG on Delphi. His noncomputer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*



This circuit adds extra safety via a DPDT switch and common mode zener diodes. Be sure to fuse *both* AC hot and neutral if you use this.

with a commercial power strip. A local hardware store sells six-outlet power strips for $12 each. I select one that is either screwed or snap-fitted together, avoiding those riveted together. I open the strip and add three MOVs and one dual zener to its circuit.

The power strip typically contains a switch, a breaker and a neon light in addition to the grounded AC power cord and the six outlets. I buy the MOVs at Radio Shack (Cat No. 276-568, $1.69). You need a 220V rated dual zener diode. This part is not available at Radio Shack, but you can find it at electronic supply houses. The cost should be under $3. If you can't find a dual one, two back-to-back regular 10-watt zeners will work fine.

I've included a schematic diagram for the surge protector. If you shop around very carefully, you may be able to build one for under $20 in parts in about one hour. Be very careful to fully insulate everything you wire in. Cloth electrical tape will come in very handy.

(Questions about this project may be directed to the author at 1633 Bayo Vista Ave., San Pablo, CA 94806. Please enclose an SASE when writing.)

TOTHIAN SOFTWARE

COCO TESTEM

Make multiple choice, matching, true/false, completion, short answer tests. Complete randomizing function. Requires printer with underline ability. Works with tape or disk. 32K ECB tape. $19.95

TEACHER PAK

Both weighted and regular grading, seating charts, alphabetizing, statistical analysis. Works with tape or disk. 16K ECB tape. $34.95

BOTH COCO TESTEM AND TEACHER PAK - $47.95

DISKMAN

Backup, reorganize, and alphabetize RS disk directories. Examine & change sectors. Catalog disk files. Printouts. 32K disk. $21.95

HOMEWARE

Versatile home management package. Use with tape or disk. Five 16K ECB/ML modules on tape:
CALENDAR - Draw calendars. Various formats.
SAVINGS/LOANS - Personal finance calculators.
DIRECTORY - Keep track of phone numbers, addresses, etc. Print address labels.
INVENTORY - For home records, hobbies, etc.
HOME-WRITER - Simple ML word processing.
Single modules: $19.95 Whole set: $49.95

Pa. residents add 6%. Send check or money order - no cash - to:

Tothian Software, Inc.
Box 663
Rimersburg, Pa. 16248

ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now, you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user-defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility. (EPROM + burning will cost about $20--we provide information concerning how you can have this done.) Features include: • repeat and edit of the last direct-mode command • 26 definable control-key abbreviations • automatic line-number prompts • DOS command • lowercase command entry (a fine complement to a Lowerkit or PBJ WordPak) • COPY (filename) to (drive number) • AE error override option • RAM command (64K) • RUNM command • text echoing to printer • ML monitor • text file scan • enhanced directory • error trapping • hi-res text utility included (42, 51, or 64 characters per line)

"I COULD NOT FIND ANY SOFTWARE THAT WOULD NOT RUN UNDER ADOS."
THE RAINBOW, December 1984
"I LOVE ADOS! . . . A GENUINELY FIRST RATE PRODUCT."
Color Micro Journal, February 1985
"I WON'T PART WITH MY ADOS EPROM FOR ANYTHING . . . NO COMPATIBILITY PROBLEMS."
Hot CoCo,May 1985

Disk . . . $27.95

THE PEEPER ML PROGRAM TRACER

Monitor machine-language programs AS THEY ARE RUNNING! Peeper actually timeshares with the target program, giving FULL CONTROL as ML programs run. Switch instantly between watching regular program output and Peeper's trace of registers and stack on screen or printer. Inspect memory in any of 26 display modes. Execution speed can be varied from full speed to the barest crawl, or halted entirely, as programs run. Single-stepping, breakpoints, memory or register examine/change. Relocatable, supports 64K use (16K required) See February '85 review.
Disk . . . $23.95 Tape . . . $21.95 Assembler source listing . . . Add 3.00

FASTAPE THE NEXT BEST THING TO A DISK DRIVE

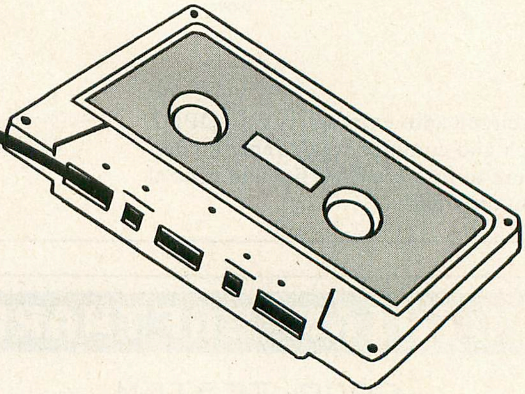
Fastape allows cassette I/O at 3000 baud--TWICE NORMAL SPEED. It uses the high-speed (POKE 65495,0) mode, and makes it convenient to stay in this mode throughout. Features automatic adjustment of cassette and printer parameters when speed mode is changed. Control-key functions for many Basic commands and for changing speed modes. Compatible with all file types, and can be used with Telewriter 64 and many other tape utilities. (16K required) See July '83 review.
*Tape . . . ~~$21.95~~ $11.95 (NEW DISCOUNT PRICE!)

SPECTROSYSTEMS
11111 N. Kendall Drive,
Suite A108
Miami, Florida 33176
(305) 274-3899 Day or Eve
No delay on personal checks
Please add $2.00 shipping. Sorry . . . no credit cards or COD's

RAINBOW ON TAPE

Those Great RAINBOW Programs Without All The Fuss! Subscribe to RAINBOW ON TAPE!

Every month, RAINBOW ON TAPE brings as many as two dozen ready-to-run programs right to you. Using the current issue of THE RAINBOW as documentation, all you have to do is load and run them. Just a one-year subscription gives you more than 230 new programs! The typing time saved is time that can be spent with the CoCo. (RAINBOW ON TAPE does not include OS-9 programs or those less than 20 lines.)



Need a back issue of RAINBOW ON TAPE? Issues available beginning with April 1982

Subscribe to RAINBOW ON TAPE Today!

LOOK FOR OUR ORDER CARD BETWEEN PAGES 34 AND 35

The cost for a single copy of RAINBOW ON TAPE is $10 within the United States; U.S. $12 in all other countries. The annual subscription rate for RAINBOW ON TAPE is $80 within the U.S.; U.S. $90 in Canada; and U.S. $105 for all other countries. **U.S. currency *only*, please**. In order to hold down non-editorial costs, we do not bill.

DISK USERS: RAINBOW ON DISK IS NOW AVAILABLE!

All the programs from THE RAINBOW — including OS-9 — are now available on disk. For more information, see page 80 of this issue.

NOW AVAILABLE ON DELPHI!

For your convenience, RAINBOW ON TAPE can also be ordered via the Delphi Information Network, in our Shopping Service area of THE RAINBOW's Color Computer SIG (Special Interest Group).

The individual programs from our past October issues are also available for immediate download in the RAINBOW ON TAPE Database area in THE RAINBOW's Color Computer SIG on Delphi. There is a $3.50 per program surcharge.

RAINBOW ON TAPE is not a stand-alone product, but is intended as an adjunct and complement to the magazine. Even if you purchase RAINBOW ON TAPE, you will still need the magazine for loading and operating instructions.

To order by phone, (*credit card orders only*) call 800-847-0309, 8 a.m. - 5 p.m. EST. All other inquiries call 502-228-4492.

Programs From Our Past Graphics Issues:

October 1985 — *Graphics Quickies*, seven short graphics programs; *Elevator*, an educational program that teaches the fundamentals of up and down; *Bytecoder*, a BASIC program designed to allow the examination and change of memory locations; *No-niner*, a game that tests your thinking ability; *Punctuation Quiz*, reviews the uses of punctuation marks; *Color Cartoons*, a graphics program that creates animation; *Zonx*, an ML arcade game with fast action and sound effects; *Puzzle Maker*, a game that teaches logic skills; *Digital Aquarium*, a graphics program that displays a realistic, animated aquarium; *Sound Story*, a demo on sound production with the SOUND, PLAY and EXEC commands; *CoCocad*, aids in drawing detailed schematics; *Heart Quiz*, a graphics display and quiz on the parts of the heart; and *Number Bumper*, an arcade game that teaches number skills and keyboard reaction.

October 1984 — *8-COLOR*, a utility to get eight colors on the PMODE 4 screen; *The CoCo School Marm Part II*, a spelling practice and examination system; *Developing a Database Manager Part IV*, a tutorial on using direct access disk files; *Follow*, a tutorial that teaches the importance of reading directions; *BLOWUP*, a graphics utility for PMODE 4 screen enlargements; *Tarot*, a Simulation of the popular card game; *Sketch*, a color graphics editor; *Pair 8*, two line printer programs for streamlining, pairing and bracketing of tournament competitions; *Little E*, an upgraded utility to add cursor controlled editing functions to the MC-10 and CoCo; *Convert*, a graphics modification to Radio Shack's *Art Gallery*; *Presidents*, a game of trivia; *Hurricane*, an electronic hurricane tracking chart; and *SCANDAL*, a beginner's assembly language tutorial.

Some Hardware Fixes for the Video Display Generator

By Tony DiStefano
Rainbow Contributing Editor

Last month, I described in detail the innards of the new CoCo B series computer. One difference nside this computer is a new version of he VDG (Video Display Generator). I described it as being an improved version of the old faithful VDG that has been in the CoCo since the beginning.

To make the new VDG compatible with the old one, the new functions of this VDG are not readily accessible. For instance, this VDG has a built-in lowercase character set. But press the old SHIFT/0 and nothing happens. You still get that crummy inverse video lowercase character. So what gives?

Well, in order to get it to work, you may have to add in a little hardware. This is where I come in. Get out the old soldering iron and dig in as I lead you through the modifications to get the most out of your new 'B' series computer. Note: The letter 'B' must appear on the model number of the computer and not inside on the PCB. For instance, the one I have is model number 21-3134B.

Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

Let's start with the basics. The old VDG chip number is Motorola MC6847. The new part is another Motorola part numbered MC6847T1, though in some computers, the part number might be XC80652P.

The first and most important change is the lowercase capability. Normally it is disabled, meaning you will not see the lowercase characters when using the SHIFT/0 on the keyboard. Instead, you get the normal inversed character set. You can change it in software. The pin that controls which mode you are in is connected to the PIA, which is memory mapped at $FF20 to $FF23, or 65312 to 65315 in decimal. It is connected to PB4 or Bit 4 of address location $FF22 or 65314. This bit is normally a zero. Changing this to a one gives you real lowercase characters. The only problem is the routine in Extended BASIC will change it back to a zero every time you print something. If you want to do it in BASIC, add this line every time you want to change the screen to true lowercase:

```
10 POKE &HFF22 , (PEEK (&HFF22)
OR 16)
```

What this line does is change Bit 4 to logical level one. But remember, each time you print on the screen or change from graphics to text, Extended BASIC changes this back. You may want to make this line into a subroutine. Better yet, why don't you do it in hardware? It's more permanent.

There are many ways of doing this change in hardware. Use the one that suits you best, but the first way I present is the simplest. Remove the chip from the socket. Bend Pin 30 (GM0) out so that it does not plug back into the socket. Solder a short piece of wire from Pin 30 to Pin 17. Pin 17 is the 5-volt supply. This action permanently changes the level of the pin to logical level one, giving lowercase all the time.

If the VDG is soldered into the board without a socket, then just cut Pin 30 at the base and pry it up. Use slim-line cutters or a razor blade. Be careful not to cut anything else.

The second way to make the hardware change requires an SPDT switch. Figure 1 shows two ways of wiring the switch to this circuit. Using Figure 1a as a guide, pull Pin 30 out as described before. Solder a wire from Pin 30 to the center of the switch. Solder another wire from one side of the switch to Pin 17 of the VDG. Solder a third wire to the other side of the switch and to Pin 1 of the VDG.

When the switch is toward Pin 17, the

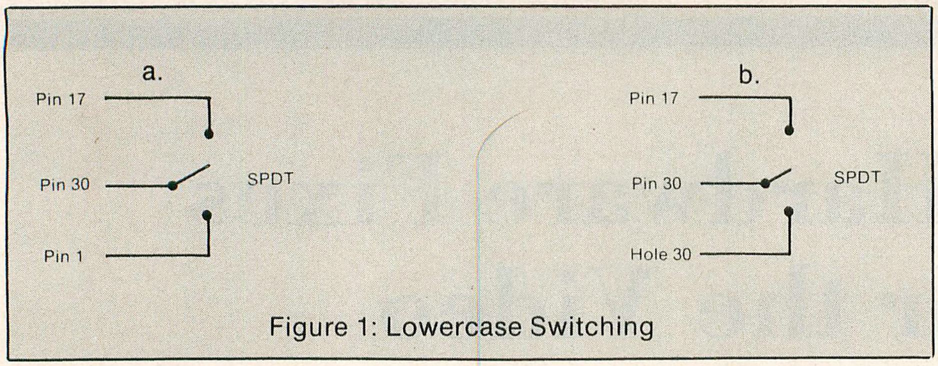


Figure 1: Lowercase Switching

display will always show lowercase characters. When it is the other way, it will always display inverse characters. Figure 1b shows basically the same way as before, but instead of connecting the third wire to Pin 1, connect it to the empty pinhole created when you pulled Pin 30. This way, when the switch is toward Pin 17, you always get lowercase characters. When the switch is the other way, you get whatever display Bit 4 of the PIA is set to. This is the most versatile way of connecting this pin.

The next change has to do with the border. In the normal text mode you see a big green square with black letters. This border is always black in the text mode. Now there is another alternative. How about a green border? There is a way of doing this in software. The pin that controls which mode you are in is connected to the PIA which is memory mapped at $FF20 to $FF23 or 65312 to 65315 in decimal. It is connected to PB6 or Bit 6 of address location $FF22 or 65314. This bit is normally a zero. Changing this to a one gives a green border. The only problem is that the same routine in Extended BASIC that changes the lowercase pin every time you print something also changes this pin. If you want to do it in BASIC, add this line:

```
10 POKE &HFF22 , (PEEK (&HFF22)
OR 64)
```

What this line does is change Bit 6 to logical level one. If you want to change both the lowercase and the green border, change the last value to 80 (16 + 64). The new line to change both the lowercase and green border would look like this:

```
10 POKE &HFF22 , (PEEK (&HFF22)
OR 80)
```

But remember, every time you print on the screen or change from graphics to text, Extended BASIC changes this back, so again, you may want to make this line into a subroutine. And again, this can be done in hardware.

One way to do this is to remove the chip from the socket. Bend Pin 27 out so that it does not plug back into the socket. Solder a short piece of wire from Pin 27 to Pin 17. This action permanently changes the pin to logical level one, giving a green screen all the time.

If the VDG is soldered into the board without a socket, cut Pin 27 at the base and pry it up.

The second way requires an SPDT switch. Figure 2 shows two ways of wiring the switch to this circuit. Pull Pin 27 out as described previously (see Figure 2a). Solder a wire from Pin 27 to the center of the switch. Solder another wire from one side of the switch to Pin 17 of the VDG. Solder a third wire to the other side of the switch and to Pin 1 of the VDG.

When the switch is toward Pin 17, the display will always have a green border; when it's the other way, it will always have a black border. Figure 2b is basically the same way as before, but instead of connecting the third wire to Pin 1, connect it to the empty pinhole created when Pin 27 was pulled. This way, when the switch is toward Pin 17, you always get a green border and when the switch is the other way, you get whatever display Bit 6 of the PIA is set to. This is also the most versatile way of connecting this pin.

The third modification is the famou inverse video screen. You no longe need to add a gate to do inverse vide The procedure is basically the same a the others, but with different values an different pin numbers. You can chang it in software. The pin that contro which mode you are in is connected t PB5 or Bit 5 of address location $FF2 or 65314. This bit is normally a zer Changing it to a one gives you a inverse video screen. But remembe Extended BASIC will change it back. I you want to do it in BASIC, add this lin every time you want to change to a inverse screen:

```
10 POKE &HFF22 , (PEEK (&HFF22
OR 32)
```

This line changes Bit 5 to logical leve one. To change both the lowercase an the inverse video, change the last valu to 48 (32 + 16). The new line to chang both the lowercase and inverse vide looks like this:

```
10 POKE &HFF22 , (PEEK (&HFF22)
OR 48)
```

Since Extended BASIC will change this back, again you may want to make this line into a subroutine. Don't bother to add the green border value when using the inverse video — it has a lower priority and shuts off anyway. Again, you can do it in hardware.

To make the change in hardware, remove the chip from the socket and bend Pin 29 out. Solder a short piece of wire from Pin 29 to Pin 17. This permanently changes the pin to logical level one, giving inversed video all the time. (Pin 17 is the 5-volt supply.)

If the VDG is soldered into the board without a socket, then just cut Pin 29 at the base and pry it up.

The second way uses an SPDT switch. Figure 3 shows two ways of

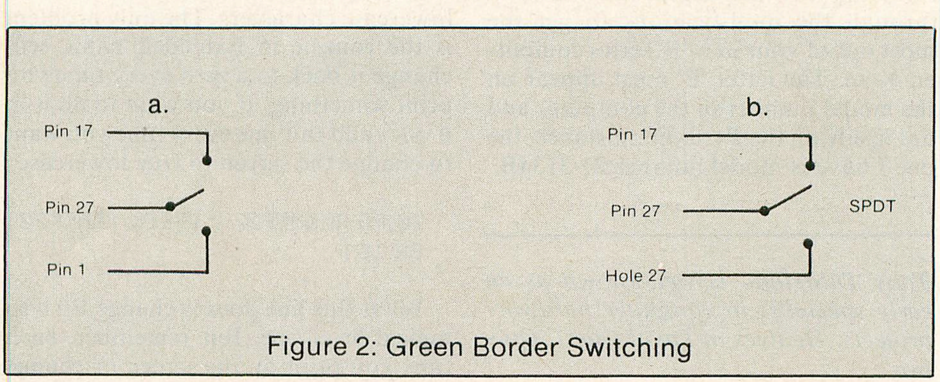


Figure 2: Green Border Switching

wiring the switch to this circuit. To use the first method (Figure 3a), pull Pin 29 out. Solder a wire from Pin 29 to the center of the switch. Solder another wire from one side of the switch to Pin 17 of the VDG. Solder a third wire to the other side of the switch and to Pin 1 of the VDG.

When the switch is toward Pin 17, the display will always have an inverse video; when it's the other way, it will always have a normal screen. The second method (Figure 3b) is much the same as the first. Instead of connecting the third wire to Pin 1, connect it to the empty pinhole. When the switch is toward Pin 17, you always get inverted video; when the switch is the other way, you get whatever display Bit 5 of the PIA is set to.

These three changes to the new VDG add to the versatility of the CoCo's display. However, I suggest you wire the three pins using the SPDT switches and the empty hole left by each pin because, when in any graphics mode, these three pins are also used by the VDG to control which graphics mode you are in.

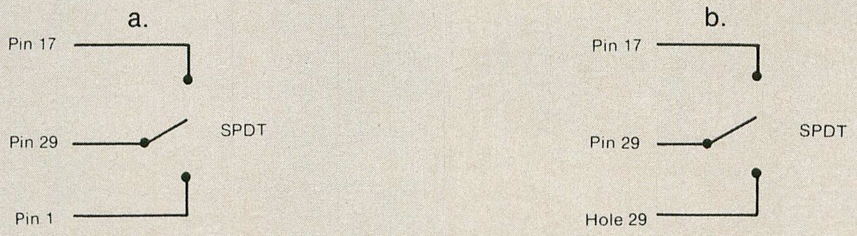


Figure 3: Inverse Video Switching

> ***"You no longer need to add a gate to do inverse video."***

If you hard wire the pins into a particular mode, you will loose certain graphics modes, depending on which pin you hard wired. If you use the most versatile way for each switch, all you have to do to return to the normal or default mode when you need a certain graphics mode is to throw a few switches.

Next month, I'll get into a step-by-step description of how to integrate the new MC6847T1 chip into your older non-'B' CoCos. I wonder just how many original CoCos are still out there? I would like to thank James R. Igou of Newark, Delaware for supplying me with the manual and an MC6847T1 chip to work with. I would also like to thank Bill Warnica of Barrie, Ontario, for his assistance with this and the next article on the new VDG chip.

THE BEST SELLING COCO DIGITIZER
JUST GOT BETTER . . . $125.00

GRAPHICOM/ VIDEO DIGITIZER

Input directly into Graphicom for easy enhancements, manipulation, stamping, and storage. Accepts composite video signal in (1.0v p-p) from video camera, VCR, video disc player, another computer, or other compatible video sources. View "off air" or "VCR" digitized video at close to real-time (a full 13 frames a second!!). "Snapshot" video frames to the digitizer's internal memory.
Use with your multi-pak, "Y" box, or a "Y" cable ("Y" Box Cat. No. 162CH available at $29.95 / "Y" cable Cat. No. 137CH available at $19.95)
Video is input via a RCA phono connector. External controls for HORIZONTAL POSITION, VERTICAL POSITION, HORIZONTAL WIDTH, BRIGHTNESS, and CONTRAST (FUZZ) settings.
Don't be fooled by imitations ... this is the GRAPHICOM VIDEO DIGITIZER
REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS. A FREE GRAPHICOM PROGRAM, AND PICTURE DISK ARE SUPPLIED WITH PURCHASE OF VIDEO DIGITIZER (A $50 VALUE) ... NEW LOW PRICE! $125.00

ADD $5.00 FOR HANDLING • SHIPPED FREE, FEDERAL EXPRESS

Check or M.O.

Computize INC.
(215) 946-7260 P.O. BOX 207 • LANGHORNE, PA 19047

PA residents add 6% sales tax

A Discussion About Sexism in the Computer Industry

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Is computer education sexist? It is true that more boys than girls are computer hackers, own home computers and take computer classes in school. Ever since computer education began in this country, educators have noted that computer use seems to be associated with gender, and have tried to provide some explanations for it. One explanation deals with child rearing practices. Boys are thought to be trained to enjoy more violent activities, such as the "shoot-'em-up" arcade games.

Another explanation involves academic performance. Boys tend to score higher on group achievement tests in mathematics than girls. Since programming a computer is somewhat math oriented, it makes sense that more boys than girls might become proficient in this activity.

Some explanations center on biological differences between boys and girls. Some recent medical research indicates that the brains of males and females are indeed different. The differences, however, are very small, and at present there is no way to determine what effects these chemical differences may have on behavior.

No single explanation can account for the fact that a higher proportion of boys is interested in computers. However, the real issue is whether any girl, if she wants, can successfully achieve her potential and express herself through computers. The answer is obviously affirmative. Women have provided excellent programs for computers, and contributed to the progress of the computer industry. As an example, let's have a short history lesson.

All right, all you programmers — who was the first programmer? Based on the preceding paragraph, you may correctly assume a woman has that honor. The right answer, as you may know, is Lady Augusta Ada Lovelace. Yes indeed, Lady Ada was the first programmer, working with Charles Babbage's Analytical Engine. Babbage created a mechanical computing device during the first half of the 1800s, and Ada programmed it.

Lady Ada lived from 1816 to 1852. Her father was the poet Lord Byron, familiar to anyone who has taken a high school English literature course. Lady Ada was a poet in her own fashion — not with words, like her father, but with the Analytical Engine. She developed the concepts of subroutines and loops while programming Babbage's machine. You may have heard of the programming language developed by the Defense Department called ADA, honoring Lady Ada Lovelace.

The Analytical Engine, however, was not an electronic device, but a mechanical one. Wheels, gears and cams did the work instead of switches, wires and relays. The machine was not a *true* computer.

Let's go to the second programmer, or the first electronic programmer. Sorry guys, but the person holding this honor is also a woman, Grace Murray Hopper. Grace Hopper was a math teacher at Vassar and Barnard, and a lieutenant in the Navy during World War II. She wrote the complex instructions that made the Mark I, or Automatic Sequence Controlled Calculator, work in 1943.

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in the central office of a school district and is currently employed at the Illinois State Board of Education.

To her, the solution to making the computer work was obvious. "Why start from scratch with every single program you write? Develop one that would do a lot of the basic work over and over again for you."

Grace Hopper designed a computer language called FLOW-MATIC. She is often credited with inventing the COBOL language, although a committee actually designed it, based on her earlier work. While working for the Department of Defense, she was responsible for developing a compiler that would make COBOL run on almost any computer.

Grace worked with the company that built the Univac I, and stayed on until she retired in 1971. She has won nearly every award in the computer industry, is a captain in the Naval Reserve, travels worldwide giving speeches and hopes to celebrate New Year's Eve in 1999, when she will be 94 years old.

There are, of course, many talented women in the computer field. Some write programs; some manage software firms; some provide instruction about computers. In general, however, females are less represented in the industry than males. This situation will probably change during the next few years. Girls in school are being required to take computer courses, just as boys are. Women are entering the professional job markets and finding that computers represent an area of employment. Women are beginning to appear in computer clubs (only a few, but still more than just a few years ago) and on bulletin boards.

> ***"No single explanation can account for the fact that a higher proportion of boys is interested in computers."***

Perhaps our role as educators is to provide encouragement for any student interested in computers. It may be that because of cultural and historical forces, different types of encouragement are needed for female students. If they need role models, there are none better than Lady Ada Lovelace and Grace Murray Hopper. Who knows — perhaps the first programmer of the optical computer (using light as opposed to electric impulses) will also be a woman.

TANDY COMPUTER DISCOUNTS

COLOR COMPUTERS

26-3127 64k color comp	140.00
26-3131 1st disk drive	269.95

PRINTERS

26-1276 DMP 105	160.00
26-1277 DMP-430	580.00
26-1280 DMP-130	269.00

MODEL 4 and MSDOS COMPUTERS

25-1050 Tandy 1000 EX	650.00
25-1051 Tandy 1000 SX	950.00
25-01011 Plus expansion board	155.00
25-1005 2nd drive mod 1000	145.00
25-1020 VM-4 Monochrome monitor	110.00
26-1070 mod 4D 64k 2dr.	920.00
26-5103 mod 2000 2dr.	1,400.00
26-5104 mod 2000 HD	2,200.00

We Carry the Complete Line of Tandy Computer Products at Discount Prices

CALL FOR A FREE PRICE LIST 800-257-5556
IN N.J. CALL 609-769-0551

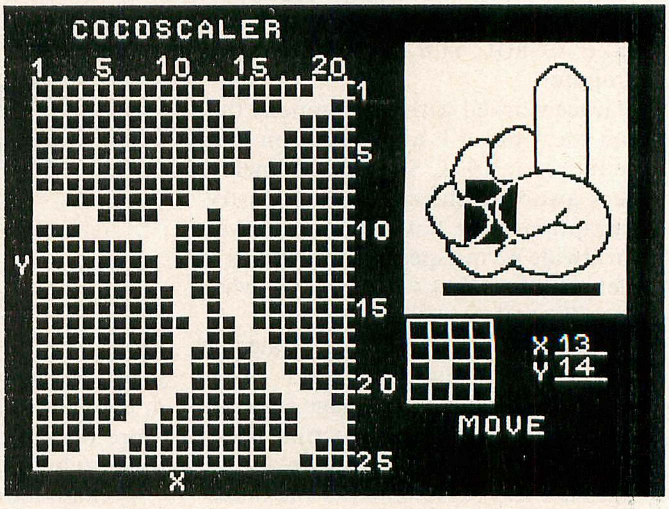
WOODSTOWN ELECTRONICS
Rt. 40 E. WOODSTOWN, N.J. 08098

32K
Disk

An easy-to-use detailer for CoCo drawings

The CoCo Scaler

By Wayne Womack



The CoCo Scaler can be used to get more detail in your drawings. While you draw on a low resolution screen, your drawing is displayed in high resolution in the upper-right corner of the screen. The commands available in *CoCo Scaler* are Move, End, Set and Reset.

Each section of the high resolution screen can be worked on, one section at a time, in the low resolution section. First, load an old drawing or create a new one. If you want an old drawing, it will be loaded and will show up in the high resolution grid. Press 'M' to move a section of the picture to the editing grid. Use the arrows to move the block marker to the correct section. Then press 'S' or 'R' and that section is moved to the editing grid.

Once the section is in place, use the joystick to move to the correct square. Pressing the firebutton fills the square with white (if you press 'R') or black (if you press 'S'). You can toggle between 'R' and 'S' as needed. As you edit in the low resolution grid, the picture in the high resolution grid is also changed. When finished with one section, press 'M' to get another section. When you are finished changing the picture, press 'E' and give your drawing a name. It will be saved with the extension `/DRW`.

(You may direct questions about this program to the author at 12738 Gist Road, Bridgeton, MO 63044. Please enclose an SASE for a reply.) ☐

Line	Function
10-30	Remark statements.
40-50	Initialize program.
60-320	Create each letter of the alphabet.
233-610	Create the numbers.
620-630	More program initialization.
640-1130	Draw the Title Screens.
1140	Timing Loop.
1150	Clears the screen.
1160-1200	Let you choose an old drawing or start a new drawing.
1210-1220	Draw frame for the high resolution screen in the upper right corner of the screen.
1230-1250	More program initialization.
1260	Writes *CoCo Scaler* at top of screen.
1270-1330	Draw the grid used for the low resolution screen.
1340-1490	Draw numbers and letters on the screen.
1500-1520	Draw the move screen grid.
1530-1710	Joystick and Command processing lines.
1720-1780	Draw X and Y position on the screen.
1790-1920	Show you where you are on the high resolution screen.
1930-2100	Scan the high resolution area and transfer it to the low resolution side for editing.
2110	Clears everything off screen except the drawing area for saving the picture to disk.
2110	Timing loop.
2130-2200	Save the drawing to disk.
2210-2280	Load a drawing.
2290-2310	This is a temporary block to show you where you are while in moving mode.

Wayne Womack has been a commercial artist for 15 years and lives in Bridgeton, Missouri. In the evenings he teaches BASIC *programming at a local high school.*

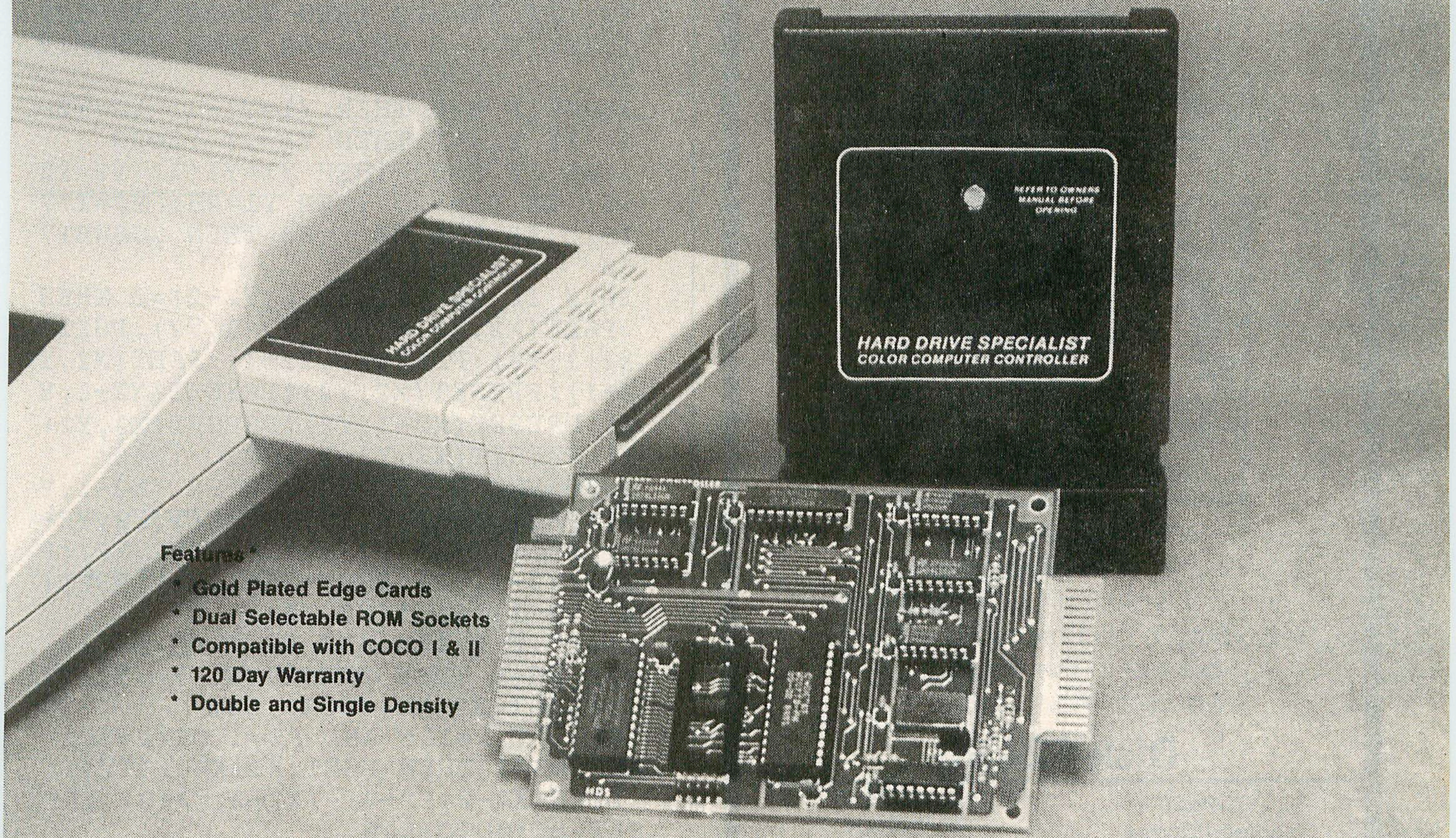
180	11	1620	133
360	126	1700	22
580	82	1860	136
840	232	2000	73
1030	196	2170	173
1240	174	END	22
1480	176		

The listing: SCALER

```
10 'THE COCO SCALER
20 'BY VW SOFTWARE
30 '10/21/84
40 CLEAR1500:PCLS
50 DIM NO$(25),A(25),SC(25)
60 '***LETTERS***
70 LA$="BM+1,0U4E2F2D2BL4R4D2BR3
"
80 LB$="BM+1,0U6R3F1D1G1BL3R3F1D
1G1BL3R3BR4"
90 LC$="BM+1,0BR3E1BU4H1L2G1D4F1
R2BR4"
100 LD$="BM+1,0BR3E1U4H1L3D6R3BR
4"
110 LE$="BM+1,0BR5BU6L5D3R3BL3D3
R5BR3"
120 LF$="BM+1,0BR5BU6L5D3R3BL3D3
BR6"
130 LG$="BM+1,0BR5E1U2L2BR2BU2H1
L2G1D4F1R2BR4"
140 LH$="BM+1,0U6BD3R4BU3D6BR4"
150 LI$="BM+1,0BU6R4BL2D6BL2R4BR
3"
160 LJ$="BM+1,0BU1F1R2E1U5BD6BR4
"
170 LK$="BM+1,0U6BD3R2E2U1BL2BD3
F2D1BR3"
180 LL$="BM+1,0U6BD6R5BR3"
190 LM$="BM+1,0U6R1F2D1U1E2R1D6B
R3"
200 LN$="BM+1,0U6F5BU5D6BR3"
210 LO$="BM+1,0BR3L2H1U4E1R2F1D4
G1BR4"
220 LP$="BM+1,0U6R3F1D1G1L3D3BR7
"
230 LQ$="BM+1,0BR3L2H1U4E1R2F1D4
G1BH1F2BU1BR3"
240 LR$="BM+1,0U6R3F1D1G1BL3R3F1
D2BR3"
250 LS$="BM+1,0BU1F1R2E1U1H1L2H1
U1E1R2F1BD5BR3"
260 LT$="BM+1,0BR6BU6L6BR3D6BR5"
270 LU$="BM+1,0BU6D5F1R3E1U5BD6B
R3"
280 LV$="BM+1,0BU6D4F2E2U4BD6BR3
"
290 LW$="BM+1,0BU6D6R1E2U2D2F2R1
BU6D6BR3"
300 LX$="BM+1,0U1E4U1BL4D1F4D1BR
3"
310 LY$="BM+1,0BU6D2F2E2U2BL2BD4
D2BR5"
320 LZ$="BM+1,0BU6R4D1G4D1R4BR3"
330 '***NUMBERS***
340 NO$(0)="BM+1,0BR1R2E1U4H1L2G
1D4F1BH1E4BD5BR3"
350 NO$(1)="BM+1,0BU4E2D6BR3"
360 NO$(2)="BM+1,0BU5E1R2F1D1G4R
4BR3"
370 NO$(3)="BM+1,0BU5E1R2F1D1G1L
1BR1F1D1G1L2H1BF1BR6"
380 NO$(4)="BM+1,0BU2E4D6BL4BU2R
6BD2BR3"
390 NO$(5)="BM+1,0BR4BU6L4D3R3F1
D1G1BL3BU1F1R2BR3"
400 NO$(6)="BM+1,0BR5BU5H1L2G1D4
F1R2E1U1H1L3BD3BR6"
410 NO$(7)="BM+1,0BR3U2E3U1L5BD6
BR8"
420 NO$(8)="BM+1,0BR3L2H1U1E1H1U
1E1R2F1D1G1L2BR2F1D1G1BR4"
430 NO$(9)="BM+1,0BU1F1R2E1U4H1L
2G1D1F1R3BD3BR4"
440 NO$(0)="BM+6,-1U4H1L2G1D4F1R
2E1G1BR4"
450 NO$(10)=NO$(1)+NO$(0)
460 NO$(11)=NO$(1)+NO$(1)
470 NO$(12)=NO$(1)+NO$(2)
480 NO$(13)=NO$(1)+NO$(3)
490 NO$(14)=NO$(1)+NO$(4)
500 NO$(15)=NO$(1)+NO$(5)
510 NO$(16)=NO$(1)+NO$(6)
520 NO$(17)=NO$(1)+NO$(7)
530 NO$(18)=NO$(1)+NO$(8)
540 NO$(19)=NO$(1)+NO$(9)
550 NO$(20)=NO$(2)+NO$(0)
560 NO$(21)=NO$(2)+NO$(1)
570 NO$(22)=NO$(2)+NO$(2)
580 NO$(23)=NO$(2)+NO$(3)
590 NO$(24)=NO$(2)+NO$(4)
600 NO$(25)=NO$(2)+NO$(5)
610 MI$="BM+2,-3R3BD3BR2"
620 A=5:B=20
630 PMODE 4,1: PCLS: SCREEN 1,1
640 DRAW "BM81,177;XLV$;": DRAW
"BM80,177;XLV$;": DRAW "BM90,177
;XLW$;": DRAW "BM91,177;XLW$;"
650 DRAW "BM105,177;XLS$;XLO$;XL
F$;XLT$;XLW$;XLA$;XLR$;XLE$;"
660 PMODE 4,1
670 LINE(4,4)-(250,166),PSET,B
680 LINE(4,182)-(250,182),PSET
690 LINE(4,185)-(250,185),PSET
```

```
700 XX=254:YY=166
710 NT$="L255O4V3T255;4;4;"
720 FORX=4TO250 STEP5
730 XX=XX-5
740 LINE(X,4)-(XX,YY),PSET
750 PLAY NT$
760 NEXT
770 FORY=8TO166 STEP5
780 YY=YY-5
790 LINE(4,YY)-(250,Y),PSET
800 PLAY NT$
810 NEXT
820 FORI=1TO1000:NEXTI
830 LINE(4,4)-(250,165),PRESET,B
F
840 LINE(6,167)-(250,181),PRESET
,BF
850 NT$="L200O2;1;2;3;4;"
860 VN$="V1T15"
870 DRAW "BM95,177;XLP$;XLR$;XLE
$;XLS$;XLE$;XLN$;XLT$;XLS$;"
880 X=4
890 PLAY VN$
900 FORY=5TO52 STEP4: X=X+6
910 LINE(X,Y)-(X*2.75,Y*2.75),PS
ET,B
920 FORI=1TO2
930 PLAY "V+T+"+NT$
940 NEXTI
950 LINE(X+1,Y*2.75)-(X*2.75,Y*2
.75),PRESET
960 LINE(X*2.75,Y+1)-(X*2.75,Y*2
.75),PRESET
970 NEXTY
980 LINE(82,52)-(82*2.75,52*2.75
),PSET,B
990 FORI=1TO2:PLAY "V+T+"+NT$:NE
XTI
1000 LINE(6,167)-(250,181),PRESE
T,BF
1010 DRAW"BM95,95;S16;XLC$;XLO$;
XLC$;XLO$;":DRAW"BM96,94;XLC$;XL
O$;XLC$;XLO$;S12;"
1020 DRAW"BM102,119;XLS$;"
1030 DRAW"BM119,119;XLC$;"
1040 DRAW"BM135,119;XLA$;"
1050 DRAW"BM152,119;XLL$;"
1060 DRAW"BM171,119;XLE$;"
1070 DRAW"BM190,119;XLR$;"
1080 DRAW"BM+0,0;S4;"
1090 LINE(4,163)-(250,163),PSET
1100 DRAW "BM50,177;XLC$;XLO$;XL
P$;XLY$;XLR$;XLI$;XLG$;XLH$;XLT$
;"
1110 DRAW "BM135,177;XNO$(1);XNO
$(0);XMI$;XNO$(2);XNO$(1);XMI$;X
NO$(8);XNO$(4);"
1120 PLAY "T4O4"
1130 PLAY "V2L8CFAO+CP8O-AL4.O+C
P4P8O-"
1140 FORI=1TO1000:NEXTI
1150 PCLS
1160 CLS:PRINT:PRINT:PRINT:PRINT
"     NEW OR OLD SCREEN":PRINT
:PRINT"          PICK N OR O"
1170 X$=INKEY$
1180 IF X$="O"THEN2210
1190 IF X$="N"THEN1220
1200 GOTO1170
1210 '***SMALL DRAWING BOARD***
1220 LINE(155,15)-(239,119),PSET
,BF
1230 '***INIT PROGRAM***
1240 PMODE 4,1:SCREEN1,1:RS=0:X1
=1:Y1=1:X2=15:Y2=33:X3=160:Y3=12
6:X4=157:Y4=17
1250 DIM M(21,26)
1260 DRAW "BM27,12;XLC$;XLO$;XLC
$;XLO$;XBK$;XLS$;XLC$;XLA$;XLL$;
XLE$;XLR$;"
1270 '***LARGE GRID***
1280 FORX=12 TO 132 STEP6
1290 LINE(X,28)-(X,180),PSET
1300 NEXT X
1310 FORY=30 TO 180 STEP6
1320 LINE(12,Y)-(135,Y),PSET
1330 NEXT Y
1340 '***NUMER LARGE GRID***
1350 DRAW "BM 11,27;XNO$(1);"
1360 DRAW "BM 36,27;XNO$(5);"
1370 DRAW "BM 59,26;XNO$(1);":DR
AW "BM 65,27;XNO$(0);"
1380 DRAW "BM 89,26;XNO$(1);":DR
AW "BM 96,27;XNO$(5);"
1390 DRAW "BM 119,26;XNO$(2);":D
RAW "BM 125,27;XNO$(0);"
1400 DRAW "BM 4,103;XLY$;"
1410 DRAW "BM 64,188;XLX$;"
1420 DRAW "BM 136,36;XNO$(1);"
1430 DRAW "BM 136,60;XNO$(5);"
1440 DRAW "BM 136,90;XNO$(10);"
1450 DRAW "BM 136,120;XNO$(15);"
1460 DRAW "BM 136,150;XNO$(20);
1470 DRAW "BM 136,180;XNO$(25);"
1480 DRAW "BM 203,135;XLX$;":LIN
E(212,135)-(231,135),PSET
1490 DRAW "BM 203,145;XLY$;":LIN
E(212,145)-(231,145),PSET
1500 '***MOVE GRID***
1510 FORY=122 TO 154 STEP 8: LIN
E(156,Y)-(188,Y),PSET:NEXTY
1520 FOR X=156 TO 188 STEP 8:LIN
E(X,122)-(X,154),PSET:NEXTX:PAIN
T(X3,Y3):GOSUB1730:GOSUB1760:DRA
W "BM 175,166;XBK$;XLS$;XLE$;XLT
$;"
1530 '***COMMANDS***
1540 X$=INKEY$
```

The Best Money Can Buy . . .
HDS Floppy Drive Controller Board


HARD DRIVE SPECIALIST
COLOR COMPUTER CONTROLLER
REFER TO OWNERS MANUAL BEFORE OPENING
HARD DRIVE SPECIALIST
COLOR COMPUTER CONTROLLER
HDS

Features *

- * Gold Plated Edge Cards
- * Dual Selectable ROM Sockets
- * Compatible with COCO I & II
- * 120 Day Warranty
- * Double and Single Density

Reduce your I/O errors with the Hard Drive Specialist Floppy Drive Controller for the Color Computer. Gold edge card connectors, advanced design, and the absence of potentiometers make it the best available. Our newest version controller allows the use of either (two 24 pin ROMS), or (one 24 pin and one 28 pin ROM). Using this board with the standard Radio Shack ROM gives you 100% compatibility with all Radio Shack software.

Completed and Tested Board with Radio Shack ROM	**$99.**
(Includes Case, and DOS Instructions)	
Completed and Tested Board without ROM	**$79.**
(Includes Case)	
Bare Board with Instruction manual	**$30.**
Parts Kit For Bare Board without ROM	**$30.**
Radio Shack ROM (current version)	**$20.**
Radio Shack ROM 1.0	**$40.**

DOUBLE SIDED!

Drive 0 Complete	$199.
Drive 1 Complete	$129.
Drive 0 & 1 Dual Drive	$319.

Ordering Information:
Use our WATS line to place your order via Visa, MasterCard, or Wire Transfer. Or mail your payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

HARD DRIVE SPECIALIST

1-713-480-6000
Order Line 1-800-231-6671
16208 Hickory Knoll
Houston, Texas 77059

Introducing...

White Fire
Of Eternity

White Fire is a full 64K super animated graphic adventure. In an age of magic and monsters, you are lost in the forbidden woods trying to get out...

Disk $24.95

CGP-220
Screen Dump

A graphics screen dump utility for the CGP-220 Ink Jet Printer. Features include Fast machine language, four-color and one-color versions, special CoCo Max version, user selectable colors, regular or double-size printout. 16K

Tape $14.95 Disk $17.95

5.25 SSDD for only .85 ea.
Quality Media • Hub Rings
Write Protect Tabs • Tyvec Env.
Save! Order 60+ .80 ea.

Adventure In
Mythology
By Scott Cabit

An animated graphics adventure. Battle monsters and discover treasures as you assume the personalities of various heroes in ancient Greek mythology! Your goal is to win the hand of the beautiful Atalanta, the swift-running huntress. But beware of the perils and obstacles that stand in your way as you journey through ancient Greece! Four-voice music and sound effects, auto-matic speech when using a Tandy SSC speech pak. Load and Save feature. Over 250 locations. 64K machine lan-guage

Tape $21.95 Disk $24.95

More Great Software!!!!

Eagle Lunar Lander 32K	$21.95*	Maycode 6809 Disassembler, 32K	$21.95*
Marooned! Graphic Adventure, 32K Disk	$24.95	Menu Maker ML Utility, 32K Disk	$19.95
Blackjack Dealer With Feeler Dealer, 32K	$21.95*	Hires+ Screen Enhancer, 16K Tape	$19.95
Alpha 40+ Formats 40+ Tracks. 32K Disk.	$19.95	64K Print Spooler 64K Tape	$9.95

*Add $3.00 For Disk

Saguaro Software

4137 E. Bermuda
Tucson, AZ 85712
(602) 881-6786

Add $2.00 for Shipping • C.O.D. Order Add $3.00
Arizona Residents Add 7% Tax • Dealer Inquires Invited
Call Or Write For Free Catalog!
Authors- We're Seeking Good Software Now!

```
1550 J=JOYSTK(0):K=JOYSTK(1):P=P
EEK(65280)
1560 IF J=0 THEN X1=X1-1: X2=X2-
6: IF X1<=1 THEN X1=1: X2=15
1570 IF J=63 THEN X1=X1+1: X2=X2
+6: IF X1=>20 THEN X1=20: X2=129
1580 IF J=0 OR J=63 THEN GOSUB17
30
1590 IF K=0 THEN Y1=Y1-1: Y2=Y2-
6: IF Y1<=1 THEN Y1=1: Y2=33
1600 IF K=63 THEN Y1=Y1+1: Y2=Y2
+6: IF Y1=>25 THEN Y1=25: Y2=177
1610 IF K=0 OR K=63 THEN GOSUB17
60
1620 IF PPOINT(X2-2,Y2-2)=0 THEN
 PSET(X2,Y2):PSET(X2-1,Y2):PSET(
X2+1,Y2):PSET(X2,Y2+1):PSET(X2,Y
2-1):PRESET(X2,Y2):PRESET(X2-1,Y
2):PRESET(X2+1,Y2):PRESET(X2,Y2+
1):PRESET(X2,Y2-1):GOTO 1640
1630 PRESET(X2,Y2):PRESET(X2-1,Y
2):PRESET(X2+1,Y2):PRESET(X2,Y2+
1):PRESET(X2,Y2-1):PSET(X2,Y2):P
SET(X2-1,Y2):PSET(X2+1,Y2):PSET(
X2,Y2-1):PSET(X2,Y2+1)
1640 IF P=126 AND RS=0 OR P=254
AND RS=0 THEN PRESET(X1+X4,Y1+Y4
):PAINT(X2,Y2):GOTO1540
1650 IF P=126 AND RS=1 OR P=254
AND RS=1 THEN PSET(X1+X4,Y1+Y4):
 LINE(X2-2,Y2-2)-(X2+2,Y2+2),PRE
SET,BF:GOTO1540
1660 IFX$=""THEN1540
1670 IFX$="E"THEN LINE(174,156)-
(230,166),PRESET,BF:DRAW"BM175,1
66;XBK$;XLE$;XLN$;XLD$;":GOTO211
0
1680 IFX$="R"THEN SOUND1,1:RS=1:
LINE(174,156)-(230,166),PRESET,B
F:DRAW "BM 175,166;XLR$;XLE$;XLS
$;XLE$;XLT$;":GOTO1540
1690 IFX$="S"THEN SOUND1,1:RS=0:
LINE(174,156)-(230,166),PRESET,B
F:DRAW "BM 175,166;XBK$;XLS$;XLE
$;XLT$;":GOTO1540
1700 IF X$="M"THEN SOUND1,1:LINE
(174,156)-(230,166),PRESET,BF:DR
AW"BM175,166;XLM$;XLO$;XLV$;XLE$
;":GOSUB1800:GOTO1540
1710 GOTO1540
1720 '***POS. NUMBERS***
1730 LINE(209,123)-(234,134),PRE
SET,BF
1740 DRAW "BM213,133;XNO$(X1);"
1750 RETURN
1760 LINE(209,136)-(234,144),PRE
```

```
SET,BF
1770 DRAW "BM213,143;XNO$(Y1);"
1780 RETURN
1790 ***LOC. ON MOVE SCREEN***
1800 GOSUB2290
1810 X$=INKEY$: IF X$=""GOTO 181
0
1820 IF X$<>CHR$(10) AND X$<>CHR
$(9) AND X$<>CHR$(8) AND X$<>CHR
$(94) AND X$<>"S" AND X$<>"R" TH
EN 1810
1830 LINE(X3-3,Y3-3)-(X3+3,Y3+3)
,PRESET,BF
1840 IF X$=CHR$(10) THEN SOUND1,
1: GOSUB 2290: Y4=Y4+25: Y3=Y3+8
: IF Y4>92THEN Y4=92: Y3=150: SO
UND10,5
1850 IF X$=CHR$(9) THEN SOUND1,1
: GOSUB 2290: X4=X4+20: X3=X3+8:
 IF X4>217THEN X4=217: X3=184: S
OUND10,5
1860 IF X$=CHR$(8) THEN SOUND1,1
: GOSUB 2290: X4=X4-20: X3=X3-8:
 IF X4<157THEN X4=157: X3=160:SO
UND10,5
1870 IF X$=CHR$(94) THEN SOUND1,
1: GOSUB 2290:Y4=Y4-25: Y3=Y3-8:
 IF Y4<17THEN Y4=17: Y3=126:SOUN
D10,1
1880 PAINT(X3,Y3)
1890 IF X$="S" THEN SOUND1,1: GO
SUB2290: RS=0: LINE(174,156)-(23
0,166),PRESET,BF:GOSUB1940:DRAW
"BM175,166;XBK$;XLS$;XLE$;XLT$;"
:RETURN
1900 IF X$="R"THENSOUND1,1: GOSU
B2290: RS=1:LINE(174,156)-(230,1
66),PRESET,BF:GOSUB1940:DRAW "BM
175,166;XLR$;XLE$;XLS$;XLE$;XLT$
;":RETURN
1910 GOSUB2290
1920 GOTO1810
1930 '***SCAN SCREEN***
1940 LINE(209,123)-(234,134),PRE
SET,BF
1950 POKE 65495,0
1960 XS=9:YS=27
```

See You at
RAINBOWfest-Princeton
October 17-19

```
1970 FORI=1TO25:SY=I+Y4:YS=YS+6
1980 LINE(209,136)-(234,144),PRE
SET,BF
1990 DRAW "BM213,143;XNO$(I);"
2000 FORN=1TO20:SX=N+X4
2010 XS=XS+6
2020 LINE(209,123)-(234,134),PRE
SET,BF
2030 DRAW "BM213,133;XNO$(N);"
2040 A(N)=PPOINT(SX,SY)
2050 IF A(N)=0 THEN PAINT(XS,YS)
 ELSE LINE(XS-2,YS-2)-(XS+2,YS+2
),PRESET,BF
2060 NEXTN:XS=9:NEXTI
2070 LINE(209,136)-(234,144),PRE
SET,BF:DRAW "BM213,143;XNO$(Y1);
"
2080 LINE(209,123)-(234,134),PRE
SET,BF:DRAW "BM213,134;XNO$(X1);
"
2090 POKE 65494,0
2100 RETURN
2110 LINE(1,1)-(256,14),PRESET,B
F:LINE(1,15)-(154,120),PRESET,BF
:LINE(1,120)-(256,192),PRESET,BF
2120 FORI=1TO2000:NEXTI
2130 CLS:PRINT:PRINT:PRINT:PRINT
"       SAVE GRAPHICS"
2140 PRINT"        ============
"
2150 PRINT"       DRAWINGS NAME
"
2160 PRINT"          UP TO":PR
INT"     8 CHARACTERS"
2170 PRINT:PRINT"        ------
--/DRW";
2180 PRINT@294," ";:INPUTNA$
2190 IF NA$="" THEN2150
2200 SAVEM NA$+"/DRW",3584,9727,
3584:END
2210 CLS:PRINT:PRINT:PRINT:PRINT
"       LOAD GRAPHICS"
2220 PRINT"        ============
"
2230 PRINT"       DRAWINGS NAME
"
2240 PRINT"          UP TO":PR
INT"       8 CHARACTERS"
2250 PRINT:PRINT"        ------
--/DRW";
2260 PRINT@294," ";:INPUTNA$
2270 IF NA$=""THEN2230
2280 LOADM NA$+"/DRW":SCREEN1,1:
GOTO1240
2290 GET(X4+1,Y4+1)-(X4+20,Y4+25
),M,G
2300 PUT(X4+1,Y4+1)-(X4+20,Y4+25
),M,NOT
2310 RETURN
```

WE'VE OUTDONE OURSELVES!

NEW

DS-69A DIGISECTOR™
THE VIDEO DIGITIZER NOBODY CAN BEAT!

The DS-69A is the best video digitizer available for your COCO at any price. This new, turbocharged version of o original DS-69 Digisector allows your 64K COCO to see clearly into the world of any television picture.

SPEED!	The fastest — 8 images per second!
PRECISION!	The highest — 64 levels of true grey scale!
RESOLUTION!	The finest — 256 × 256 picture elements!
Compabitibility	Use with a black and white or color camera, a VCR or tuner.
Compactness	Self contained in a plug in Rompack.
Convenience	Use with a Y-cable, Multi-Pak, PBJ Bus or plug directly into the cartridge slot.
Ease of Use	Software on disk will get you up and running fast!

POWERFUL C-SEE™ SOFTWARE

C-SEE is the menu driven software package included with your DS-69A. Available on disk or cassette, it provides lightning fast 5 level digitizing to the screen, high precision 16 level digitizing for superb hard copy printout and simple keyboard or joystick control of brightness and contrast. Or call our driver routines from your own Basic program for easy 64 level random access digitizing. Pictures taken by the DS—69A may be saved on disk or cassette by C-SEE and then edited with COCO MAX, MAGIGRAPH or GRAPHICOM for special effects. Any of th popular printers may be used to obtain printouts of images digitized by the DS-69A.

ONE YEAR WARRANTY

DS-69A Digisector & C-SEE III Software	**$149.95**
OR your DS-69 &	**$ 59.95**
MAGIGRAPH Graphics Editor on disk	**$ 39.95**

DS-69 DIGISECTOR™
THERE'S ONLY ONE BETTER VIDEO DIGITIZER. . .

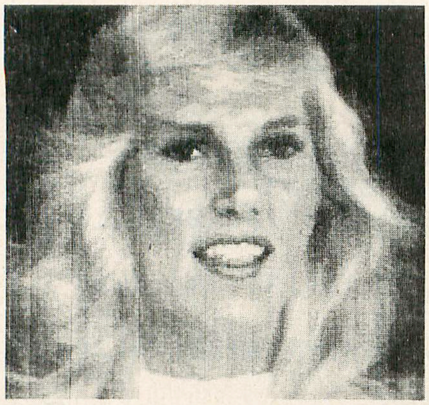
And that's the DS-69A. The DS-69 is The Micro Works' original video digitizer, tried and true since 1984. It provide almost all the features of the DS-69A and is now available at a new low price. The DS-69 features;

SLUGGISHNESS	2 images per second. Quick enough to freeze all but the fastest moving pictures.
INCOMPATIBILITY	Brightly colored scenes may be striped when using a color camera.
INCONVENIENCE	Will not work with a Y cable.

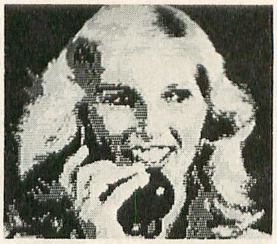
Otherwise, it's a DS-69A. Precision, resolution, compactness, ease of use, software and warranty. Except one last thing.

DS-69 Digisector & C-SEE III Software	**$ 99.95**

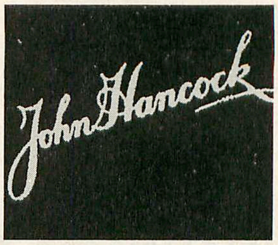
Superb image quality produced by both Digisectors.



Printout



Screen



Screen

NO RISK GUARANTEE

If you are not completely satisfied with the performance of your new DS-69A or DS- you may return it, undamaged, within ten days for a full refund of the purchase pric We'll even pay the return shipping. If you can get any of our competitors to give yo the same guarantee, buy both and return the one you don't like. We know which on you'll keep.

THE MICRO WORKS

Purveyors of Fine Video Digitizers Since 1977.

Terms: Visa, Mastercard, Check or C.O.D.

P.O. Box 1110 Del Mar, CA 92014 (619) 942-24

The Challenge Returns: Driller II Is a Thriller, Too

By Fred B. Scerbo
Rainbow Contributing Editor

ditor's Note: If you have an idea for ne "Wishing Well," submit it to Fred /o THE RAINBOW. *Remember, keep our ideas specific, and don't forget that his is* BASIC. *All programs resulting rom your wishes are for your use but emain the property of the author.*

Let's face it. Sequels are a major part of our everyday life. We've had *Rocky VI*, *Psycho III* and *oltergeist II*. If something works, we re tempted to try for a repeat of the uccess story. The "Wishing Well" is no xception. Some of the best programs n these pages have often been the nspiration for newer and better verions, or better yet, sequels. This nonth's "Wishing Well" offers a newly ritten sequel to a program that first ppeared in these pages over three years go: *Multi Math Driller*. So, here it is! he wait is over! You asked for it! The aga continues . . . *Multi Math Driller I.*

red Scerbo is a special needs instructor or the North Adams Public Schools in orth Adams, Massachusetts. He holds master's in education and has pubished some of the first software availble for the Color Computer through is software firm, Illustrated Memory anks.

The Wish

The prime motivating force behind *Driller I* was a desire to counter the effects of the math software glut which had the "let's see how many aliens you can kill" approach. As a teacher, I have a bit of a problem with the idea that zapping, blasting and killing are the best ways to teach our youngsters. Not only that, but the novelty of zapping soon wears off and actually serves as a block to our learning efforts. As a student progresses, the game aspect of such software only slows down further progress.

Driller I took a different approach. Instead of a spaceship, we have a large oil rig ready to drill into the ground. Sitting above the drill was a multipication problem. Running in an underground stream below the drill was a river of moving answers which, of course, included the correct response. When the correct answer ran under the drill, pressing the spacebar or the firebutton on the right joystick caused the drill bit to sink into the ground and detect the correct answer below it.

Sound different? It was, and I received very favorable responses from parents and teachers who found the program a welcome alternative to the violent software their youngsters were too often confronted with. To be perfectly honest, this sequel is a bit overdue. However, that is one of the problems that a column like this runs into trying to grant so many wishes. To my patient readers I offer my apologies. Better than that, however, *Driller II* is now a reality.

The Program

Driller II is designed to fit into a 16K Color BASIC CoCo and the MC-10 with the 20K expansion unit. To use the program in a 16K Extended CoCo, you will need to clear the graphics memory. You may do this in two ways: `PCLEAR1` or `POKE25,6:NEW`.

Do not use this `POKE` if you are using a disk drive. Use the `PCLEAR1` method instead. If you have 32K or 64K, you already have all the memory you need.

Driller II, like its companion program, uses `CHR$` graphics to give us an attractive nine-color screen. Since we do not need to use the Hi-Res graphics, using `CHR$` colors gives a much more dramatic effect. It also gives a much larger image since the largest number we will be working with is a two digit number.

The program contains a large number of `DATA` statements at the end of the listing. These must be keyed in exactly, since they form the basis for our enlarged letters and numbers displayed in color. Notice that several lines have only a string of commas. Be sure to key these in just as you see them.

Several parts of the listing also use lowercase letters. Be sure to use the SHIFT/'0' to type these into your CoCo. They will appear as inversed letters on your screen. The inverse video characters give us a nice effect. Use the SHIFT/'0' to return to normal again.

While the listing is similar to *Driller I*, the line arrangements are a bit different, so it is not likely that you could just alter that listing to create this one. I have made the corrections for the joy stick problem that some newer CoC owners run into, so this program shoul work on all models. (The MC-10 ver sion does not have the joystick option.

Naturally, I have designed this version to operate in much the same fash

80	109	600	191
160	242	685	193
245	104	775	79
345	69	850	202
425	209	END	70
485	175		

The listing: DRILLER2

```
1 REM*****************************
2 REM*    MULTI MATH DRILLER 2   *
3 REM*       BY FRED B.SCERBO    *
4 REM*    COPYRIGHT (C) 1986     *
5 REM*    60  HARDING AVENUE     *
6 REM*  NORTH ADAMS, MA 01247    *
7 REM*****************************
10 CLS0
15 CLEAR500
20 FOR ZZ=1TO96:BB$=BB$+CHR$(128
):NEXTZZ
25 BR=30:YS=20
30 REM IF MC-10 THEN MC=15360
35 MC=0
40 DIM A(45,9),B(4,12)
45 FORI=2TO11:FORY=1TO9:READ A(I
,Y):NEXTY,I
50 FORI=19TO44:FORY=1TO9
55 READ A(I,Y)
60 NEXTY,I
65 FORI=1TO4:FORY=1TO12:READ B(I
,Y):NEXTY,I
70 FOR ZZ=0TO31:PRINT@ZZ,CHR$(18
8);:NEXT ZZ:FOR ZZ=320TO351:PRIN
T@ZZ,CHR$(179);:NEXT ZZ:FORI=0TO
21:SET(0,I,4):SET(63,I,4):NEXT
75 W$="MULTI":C=32:L=38:GOSUB545
:W$="MATH":C=16:L=136:GOSUB545:W
$="DRILLER":C=64:L=225:GOSUB545
80 FORI=57TO61:SET(I,14,5):SET(I
,18,5):NEXT:FORI=15TO17:SET(58,I
,5):SET(60,I,5):NEXT
85 REM <SHIFT><0> FOR LOWERCASE
90 R$=CHR$(128):PRINT@417,"by"+R
$+"fred"+R$+"scerbo"+R$+R$+"copy
right";
95 POKE1467+MC,49:POKE1468+MC,57
:POKE1469+MC,56:POKE1470+MC,54
100 GOSUB685:FORI=417TO480:PRINT
@I,CHR$(128);:NEXTI
105 PRINT@353,"select"R$"speed"R
$"from"R$"fast"R$"to"R$"slow";:G
OSUB115
110 GOTO120
115 W$="1 TO 9":C=112:L=422:GOSU
B545:RETURN
120 X$=INKEY$:IFX$=""THEN120
125 X=ASC(X$):IFX<49THEN120
130 IFX>57THEN120
135 K=VAL(X$):DL=K*8
140 CLS0:W$="SELECT":C=32:L=4:GO
SUB545:W$="DESIRED":C=48:L=98:GO
SUB545
145 W$="LEVELS":C=16:L=196:GOSUB
545:W$="FROM":C=64:L=296:GOSUB54
5:GOSUB115
150 X$=INKEY$:IFX$=""THEN150
155 X=ASC(X$):IFX<49THEN150
160 IFX>57THEN150
165 K=VAL(X$)
170 CLS0:W$="DO YOU":C=80:L=5:GO
SUB545:W$="WANT THE":C=112:L=96:
GOSUB545:W$="LEVELS":L=196:C=64:
GOSUB545
175 W$="ASSORTED":C=32:L=288:GOS
UB545:W$="Y ":C=16:L=386:GOSUB54
5:W$="OR ":C=0:GOSUB545:W$="N ":
C=16:GOSUB545
180 PRINT@L+1,CHR$(190);CHR$(188
)CHR$(191);:PRINT@L+33,CHR$(128)
CHR$(188)CHR$(188);:SET(54,28,4)
185 X$=INKEY$:IFX$="Y"THEN200
190 IFX$="N"THEN205
195 GOTO185
200 AJ=1:GOTO205
205 CLS0:GOSUB215
210 GOTO220
215 W$="WHAT IS":C=16:L=3:GOSUB5
45:RETURN
220 FOR ZZ=416TO447:PRINT@ZZ,CHR
$(188);:NEXT ZZ:FOR ZZ=480TO510:
PRINT@ZZ,CHR$(179);:NEXT ZZ
225 POKE1535+MC,179
230 E=29:F=34:FORG=10TO24STEP2
235 FORI=E TO F:SET(I,G,5):NEXTI
240 SET(E-1,G+1,6):SET(F+1,G+1,6
)
245 E=E-1:F=F+1:NEXTG
250 FORI=12TO26:SET(31,I,3):SET(
32,I,3):NEXTI
255 PRINT@108,"divided"R$"by";:F
```

HOT HARDWARE

UNIVERSAL VIDEO DRIVER

IT'S THE BEST!!! **Great Price! Only $29.95**

Carefully engineered to work with ALL Color Computer models including the newest COCO II. Enables your COCO to operate with a video monitor instead of a television.

- Works with monochrome monitors!
- Works with color monitors!
- Audio Connection included!
- Easy installation— no soldering!

PCX-II COMPUTER

Total IBM compatibility at sensational prices!!!

Complete computer systems starting as low as **$649.00.**

Check our performance and prices.

TANDY 1000 UPGRADES

640K upgrade board with real time clock	**$189.95**
Serial Interface Board	**49.95**
Parallel Interface Board	**29.95**
Hayes compatible 300/1200 Baud deluxe modem	**189.95**

QUALITY VIDEO MONITORS

Sakata SC-100 Color monitor with speaker and earphone jack	**$179.95**
Samsung MD-1251K Amber Screen - great price	**89.95**
Magnavox BM-7622 Amber Screen - high quality, low price	**99.95**

Order a quality monitor from us and get a Universal Video Driver for only $24.95 — Save $5.00.

PRINTERS AND ACCESSORIES

Citizen 120-D Printer, Deluxe features	**Only $219.95**
Star NX-10 Printer, New model for '86	**279.95**

GRAFX SCREEN - versatile screen dump software. Print horizontal or vertical, image magnification, positive or negative and more - 5¼" disc.

ONLY $14.95

GRAFX SCREEN — FREE with your printer order.

SERIAL TO PARALLEL INTERFACE

300 to 9600 baud. Complete with all cables and connectors. **Only $49.95**

DISC DRIVES

Teac 55B DSDD Drive	**$119.95**
J&M JFD-CP Controller with DOS	**139.95**
Dual cabinet, power supply holds 2 horizontal 1/2 height drives	**79.95**

Drive one upgrade for new Tandy dual horizontal cabinet	**119.95**
Disc drive cable	**24.95**
Radio Shack DOS Rom 1.1 w/manual	**29.95**

DISCS • CASSETTES • ROMS • CHIPS

5¼" discs, double density, reinforced hub w/sleeve, guaranteed.

$12.95 for 10 discs in an attractive storage box.

C-10 Cassettes w/labels	**10 for $5.50**
Cassette storage box	**10 for $2.00**
Basic 1.2 ROM	**$39.95**
Extended 1.1 ROM w/Manual	**$49.95**

DISC STORAGE CASE - Attractive, heavy duty acrylic case with lock. Holds and protects 50 5¼" discs. **SUPER BARGAIN ONLY $9.95**

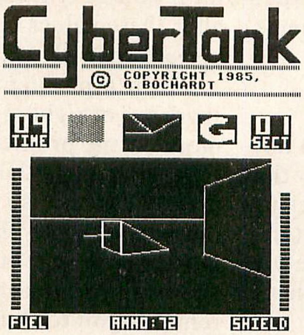
Purchase this attractive storage case including 10 discs for $21.95.

64K Memory Expansion Kit.

All parts and complete instructions (for 'E' and 'F' boards and COCO II)

NOW ONLY $19.95

SUPER SOFTWARE



ORDER NOW! 64K Disk only.
$27.95

NEW! OUTSTANDING GRAPHICS!

Tired of flying wimpy airplanes???

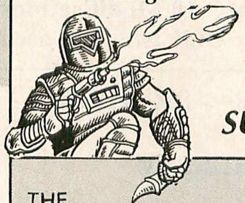
Want to try something macho for a change??

CYBERTANK is a real-time tank simulation that will get your adrenalin flowing!

Your survival depends upon lightening-fast tactical decisions. Penetrate deep into enemy territory with powerful intelligence gathering devices and sophisticated armaments. Cannons, heat seeking missiles, flame throwers, pill boxes, battle tanks... ***THIS ONE HAS IT ALL!!***

Other Super Arcade Games:

Tut's Tomb
Time Fighter



SHOCK TROOPER

Intelligence has intercepted a coded message revealing a plan to conquer Earth. Four of your Shocktroopers must infiltrate the heavily defended underground enemy base and steal all of the secret TRG-5 attack saucer sub-assemblies.

SUPER ACTION ARCADE GAME!!

THE VORTEX FACTOR

The Sixth & Most Challenging of our Adventures

What is it? What secrets does it hold? The seeker of treasures through time and space must find out! From the Coliseum of ancient Rome to the futuristic world of tomorrow.

UNFORGETTABLE ODYSSEY.

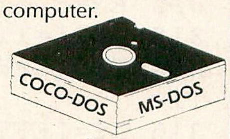
Other Exciting Adventures

Calixto Island
Shenanigans
Sea Search • Trekboer
Black Sanctum

All games -
Cassettes $24.95
Discs $27.95
32K required.

COCO UTIL II - NEW VERSION

Transfer Coco disc files to your IBM compatible computer. You may also transfer MS-DOS files to a Color Computer disc. Save hours of retyping. Coco Util has been so popular we decided to make it even more powerful and versatile... extended directories, faster, improved menu selection system and more!



$39.95

Coco Util users upgrade to the new version for only $12.95 including shipping and handling.

FOR THE SERIOUS COCO USER

Accounting System - very popular ledger system for small businesses.	**$99.95 disk**
Order Entry - an excellent companion to the accounting system	**$99.95 disk**
Easy File - get organized with this user friendly data management system	**$59.95 disk**

Super Screen - Best screen enhancement program available.
Cassette $29.95 Disk $32.95

FREE—Send for our free flier.

MD Mark Data Products

24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691 • (714) 768-1551

SHIPPING: All orders under $100 please add $2 regular, $5 air. All orders over $100 please add 3% regular, 8% air. California residents please add 6% sales tax. Orders outside the continental U.S., check with us for shipping amount; please remit U.S. funds. Software authors—contact us for exciting program marketing details. We accept MasterCard and VISA, Distributed in Canada by Kelly Software.

ion that the first one did. I have designed it so that the division problems have whole number answers.

Running The Program

On running *Driller II*, a title card not unlike the original comes up on the screen. Pressing the spacebar moves us to our choices. First, you must select the speed at which the answers run below the drill. One is the fastest while nine is the slowest.

Then you select the level of difficulty from one to nine. The number of the level corresponds to the division table presented. Next, you decide whether or not you want the levels assorted. An assortment at level nine will give problems all the way down to level one. This helps review previous levels.

Unlike other "Wishing Well" programs, *Driller I* and *II* both have a set number of problems that must be completed. In this case, the number of problems is 20 and is signified by the value YS in Line 25. The value of BR is the total number of tries at problems until you get through the 20. You may alter these values in the the listing. Just be sure that BR is larger than YS.

When a problem appears, press the spacebar or right joystick firebutton the moment the problem is under the drill. If it goes past the drill, you may be marked wrong, so adjust the speed at the beginning to fit your needs. If the answer is wrong, you will be told to try again. If you take too long, the screen reminds you to think.

If your answer is correct, the screen displays a multi-colored `CORRECT` and reprints the problem and answer. Pressing the spacebar or joystick button advances you to the next problem.

If you get all the problems right, the oil well explodes in a colorful display. I think you'll like the effect. Users of *Driller I* would often try harder to get all the answers correct. It's a nice incentive.

MC-10 Modifications

Only two lines need to be changed to make this program work on the MC-10. Change the value of MC from zero to 15360 in Line 35. Also, delete Line 345 since the joystick routine is not needed. Be sure to save the program before running it, since an error in one of the `POKE` values could crash the program and lock up your machine if you make a typo. That goes for CoCo users as well.

Conclusion

I hope that *Driller II* proves as valuable to you as *Driller I* was. In fact, if any of you have suggestions as to other "Wishing Well" programs which you would like to see expanded or revised or continued as this one was, drop me a line with your ideas. Those of you who haven't seen *Driller I* may want to request a back issue of September 1983. Who knows? Maybe someday I might put out a "Best of the Wishing Well" with some of those oldies all in one place. Let me know what you think. □

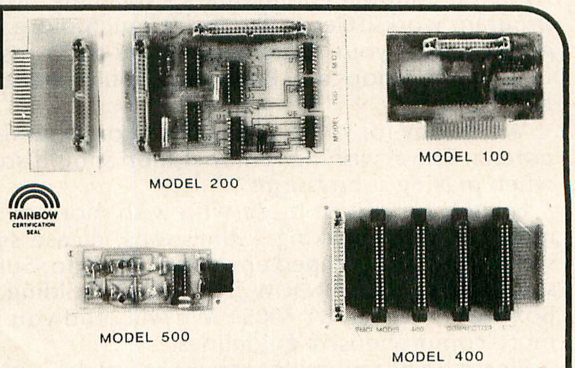
```
OR TP=1TO YS:NP=0:IF TR=>BR THEN
490
260 F=RND(9):IF F=LN THEN260
265 IF AJ=0 THEN E=K
270 IF AJ=1 THEN E=RND(K)
275 FORLL=132TO196STEP32:PRINT@L
L,R$R$R$R$R$R$R$;:NEXTLL
280 E=E*F:F=E/F:E2=E
285 IFE<10THEN300
290 EE$=STR$(E):E1=VAL(MID$(EE$,
2,1)):E2=VAL(RIGHT$(EE$,1))
295 I=E1+2:L=132:C=112:GOSUB635
300 LN=F:I=E2+2:L=136:C=112:GOSU
B635:I=F+2:L=151:GOSUB635
305 AN=E/F:F$=STR$(AN)
310 FORI=1TO6:G=RND(9):H=RND(9):
H$=STR$(G*H):F$=F$+"     "+H$:NEX
TI
315 J$=LEFT$(F$,32)
320 PRINT@448,J$;
325 L$=RIGHT$(J$,31):M$=LEFT$(J$
,1):J$=L$+M$
330 FORP=1TO DL:NEXTP:IFTR=>BR T
HEN490
335 IFINKEY$=CHR$(32)THEN370
340 REM IF MC-10 DELETE LINE345
345 POKE339,255:IFPEEK(339)=254T
HEN370
350 NP=NP+1:IFNP=150THEN360
355 GOTO320
360 PRINT@0,BB$;:W$="THINK":C=64
:L=6:GOSUB545:SOUND1,2:SOUND1,2:
SOUND1,2
365 GOTO320
370 TR=TR+1:PRINT@431,CHR$(186)C
HR$(181);:PRINT@463,CHR$(138)CHR
$(133);
375 IF AN=VAL(MID$(J$,15,4))THEN
385
380 GOTO425
385 PRINT@0,BB$;
390 FORC=16TO112STEP32:W$="CORRE
CT":L=3:GOSUB545:SOUNDC+1,1:NEXT
C
395 L=0:PRINT@0,BB$;:IFE<10THEN4
05
400 I=E1+2:L=0:C=48:GOSUB635
405 L=4:I=E2+2:C=48:GOSUB635:L=L
+4:FORI=15TO22:SET(I,2,6):NEXT:S
ET(18,0,6):SET(18,4,6):I=F+2:C=4
8:GOSUB635
410 W$=" IS":C=16:GOSUB545:W$=ST
R$(AN):C=32:GOSUB545
415 GOSUB685:PRINT@0,BB$;:GOSUB2
15:CR=CR+1:NEXT TP
420 GOTO445
425 PRINT@0,BB$;:W$="WRONG":C=64
:L=6:GOSUB545:SOUND20,1:SOUND2,1
:SOUND20,1:SOUND2,1
430 WR=WR+1:PRINT@0,BB$;:W$="TRY
":C=32:L=10:GOSUB545:FORI=1TO300
:NEXT:PRINT@0,BB$;:W$="AGAIN"
435 C=96:L=6:GOSUB545:FORI=1TO30
0:NEXT:PRINT@0,BB$;:GOSUB215:IF
NP>100THEN NP=0
440 GOTO320
```

```
445 IFTR<>YS THEN490
450 PRINT@0,BB$;:FOR JJ=448TO479
:PRINT@JJ,CHR$(159);:NEXTJJ
455 FORI=28TO10STEP-1:SET(31,I,2
):SET(32,I,2):SOUND230,1:NEXTI:F
ORI=1TO7:SET(30-I*2,10-I,2)
460 SET(33+I*2,10-I,2):SOUND230,
1:NEXTI:SET(30-I*2,11-I,2):SET(3
3+I*2,11-I,2)
465 FORI=1TO12:SET(13-I,2+I*2,2)
:SET(50+I,2+I*2,2):SOUND230,1:NE
XTI:FORI=1TO20:SOUNDRND(230),1:N
EXT
470 CLS0:W$="YOU  HIT":C=32:L=2:
GOSUB545:W$="PAYDIRT":C=64:L=98:
GOSUB545
475 W$="WITH A":C=48:L=196:GOSUB
545:W$="PERFECT":C=16:L=290:GOSU
B545
480 W$="SCORE":C=112:L=390:GOSUB
545
485 GOSUB685
490 CLS0:W$="OUT OF":C=16:L=6:GO
SUB545:W$=STR$(TR)+" TRIES":C=48
:L=96:GOSUB545:W$="YOU HAD"
495 C=32:L=196:GOSUB545:W$=STR$(
WR):C=64:L=307-(LEN(W$)*3):GOSUB
545
500 W$="MISSES":IF WR=1 THEN W$=
"  MISS"
505 C=112:L=388:GOSUB545
510 IFINKEY$=CHR$(13)THEN520
515 GOTO510
520 PRINT@483,"press"R$"enter"R$
"for"R$"another"R$"try";
525 FORI=1TO1000:NEXT
530 IFINKEY$=CHR$(13)THEN540
535 GOTO530
540 RUN
545 P=LEN(W$):FORZ=1TOP:I=ASC(MI
D$(W$,Z,1))-46
550 IFI=31THEN585
555 IFI=32THEN595
560 IFI=41THEN605
565 IFI=42THEN615
570 IFI=-14THEN625
575 GOSUB635
580 GOTO630
585 I=1:GOSUB660
590 GOTO630
595 I=2:GOSUB660
600 GOTO630
605 I=3:GOSUB660
610 GOTO630
615 I=4:GOSUB660
620 GOTO630
625 L=L+2
630 NEXT:RETURN
635 PRINT@0+L,CHR$(A(I,1)+C)CHR$
(A(I,2)+C)CHR$(A(I,3)+C);
640 PRINT@32+L,CHR$(A(I,4)+C)CHR
$(A(I,5)+C)CHR$(A(I,6)+C);
645 PRINT@64+L,CHR$(A(I,7)+C)CHR
$(A(I,8)+C)CHR$(A(I,9)+C);
650 L=L+4:RETURN
655 GOTO655
660 PRINT@0+L,CHR$(B(I,1)+C)CHR$
(B(I,2)+C)CHR$(B(I,3)+C)CHR$(B(I
,4)+C);
665 PRINT@32+L,CHR$(B(I,5)+C)CHR
$(B(I,6)+C)CHR$(B(I,7)+C)CHR$(B(
I,8)+C);
670 PRINT@64+L,CHR$(B(I,9)+C)CHR
$(B(I,10)+C)CHR$(B(I,11)+C)CHR$(
B(I,12)+C);:L=L+5:RETURN
675 PRINT@Q,CHR$(154);:PRINT@Q+3
0,CHR$(145)CHR$(128)CHR$(154)CHR
$(145);
680 PRINT@Q+63,CHR$(153)CHR$(155
)CHR$(152);:PRINT@Q+96,CHR$(152)
;:RETURN
685 FORI=1TO1500:TU=RND(9999)
690 REM MC-10 DELETE LINE695
695 IFPEEK(339)=254THEN705
700 IFINKEY$=""THENNEXT
705 RETURN
```

Robotize Your Co Co with EMC

Our unique expansion hardware enables you to create a versatile automated control system. All EMC boards come fully assembled and computer tested.

Model 100 Parallel Port (PIA) Features: Two 8 Bit Bi-Directional Ports, 4 Control Lines, Sample Software Provided	$53.85
Model 200 Buss Driver Features: TTL, Fanout of 10, 2 Card Slots and Flexible Ribbon Buss Provided. Additional Connectors Available.	$83.75
Model 400 Mother Board Features: 4 Slots, 5 Gold Pin Connectors, PC Board, for all Addr. Decoded Boards.	$54.75
Model 500 Motor Control Amp Features: TTL Compatable, LED Direction Indicators, Drives DC Motors 500 MA Max at 12 VDC.	$43.70

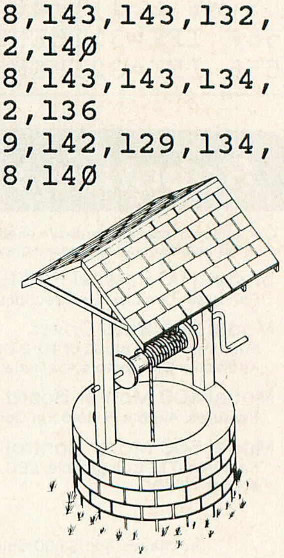


Purchases Add $3.00 Shipping & Handling with Check • Shipping is FREE with Money Orders • Florida residents add 5% sales tax • Send for FREE Brochure • For Information Call (813) 896-8295

ELECTRONIC MOTION CONTROL
P.O. Box 17271 • ARPT Station
Clearwater, Florida 33520

Dealer Inquiries Welcome

```
710 DATA135,140,139,143,128,143,
132,140,136
715 DATA129,143,128,128,143,128,
132,140,136
720 DATA142,140,139,131,140,129,
140,140,140
725 DATA140,140,139,140,140,143,
140,140,136
730 DATA143,133,138,140,141,142,
128,132,136
735 DATA143,140,140,140,140,143,
140,140,140
740 DATA143,140,140,143,140,143,
140,140,140
745 DATA142,140,143,128,135,136,
132,136,128
750 DATA143,140,143,143,140,143,
140,140,140
755 DATA143,140,143,140,140,143,
140,140,140
760 DATA135,140,139,143,140,143,
140,128,140
765 DATA143,140,139,143,140,139,
140,140,136
770 DATA143,140,140,143,128,128,
140,140,140
775 DATA143,140,139,143,128,143,
140,140,136
780 DATA143,140,140,143,140,140,
140,140,140
785 DATA143,140,140,143,140,140,
140,128,128
790 DATA143,140,140,143,132,143,
140,140,140
795 DATA143,128,143,143,140,143,
140,128,140
800 DATA132,143,136,128,143,128,
132,140,136
805 DATA140,141,142,128,133,138,
140,140,136
810 DATA143,129,142,143,141,130,
140,128,140
815 DATA143,128,128,143,128,128,
140,140,140
820 DATA,,,,,,,,,,,,,,,,,
825 DATA 143,140,143,143,128,143
,140,140,140
830 DATA143,140,143,143,140,140,
140,128,128
835 DATA143,140,143,143,129,143,
140,140,142
840 DATA143,140,143,143,141,130,
140,128,140
845 DATA143,140,140,140,140,143,
140,140,140
850 DATA140,143,140,128,143,128,
128,140,128
855 DATA143,128,143,143,128,143,
140,140,140
860 DATA139,128,135,141,131,142,
128,140,128
865 DATA,,,,,,,,,,,,,,,,,
870 DATA139,128,135,132,143,136,
128,140,128
875 DATA140,140,143,131,140,128,
140,140,140
880 DATA143,130,129,143,143,132,
136,143,140,128,128,140
885 DATA143,139,128,143,143,132,
139,143,140,128,132,140
890 DATA143,128,128,143,143,134,
137,143,132,136,132,136
895 DATA141,130,129,142,129,134,
137,130,140,128,128,140
```



Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Metric Industries Inc.

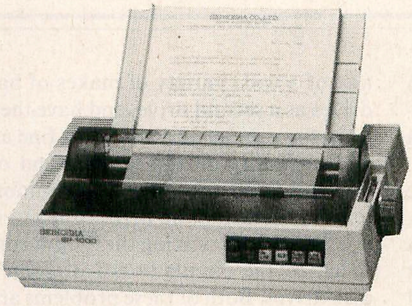
Printer-Interface Package

239.95

***Free shipping**

Compatible with the new COCO3

Seikosha SP-1000A Printer



Printout Sample

789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
/0123456789:;<=>?@ABCDEFGHI
789:;<=>?@ABCDEF
<=>?@ABCDEFGHIJKLM
789:;<=>?@ABCDEFGHI
EFGHIJKL
789:;<=>?@ABCD EFGHIJKLMNOPQ

Graphics
6 kinds of horizontal graphic density (480/ 576/640/720/960/1,920 dots/line)

Multiple copies
Original plus 2 copies

Line spacing
1/6, 1/8, 7/72, n/144, n/216 (n = 0-255) inches

Line space feed
6.7 lines/sec (6 lines/inch).
10 lines/sec (9 lines/inch).

Paper width
Pin and friction (4″ to 10″).

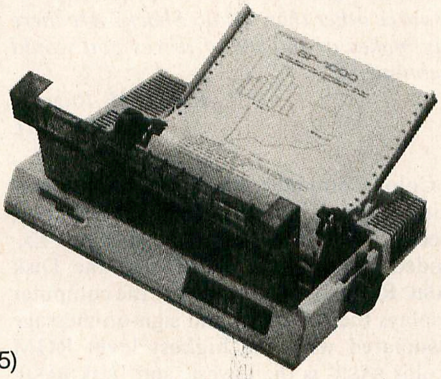
Dimensions
390W × 119H × 278D(mm) with tractor (15.4W × 4.7H × 10.9D inches)

Weight
4.9kg (10, 9 lbs)

Features of SP-1000A

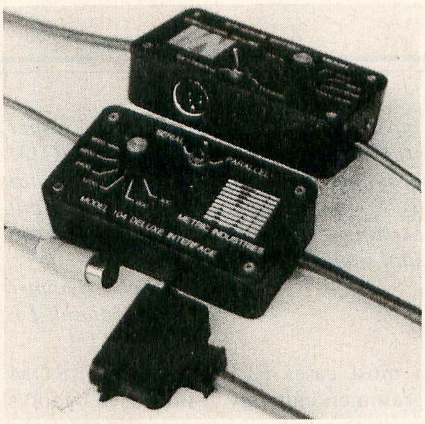
- Centronics parallel.
- Impact dot matrix method, bi-directional in logic seeking, uni-directional in graphic printing.
- 100 (Draft mode), 20 cps (Near Letter Quality) print speed, with reduced noise level.
- Pin-feed or friction-feed.
- Automatic paper loading function.
- A variety of functions including Under line, Bold print, Double striking.
- A variety of print character sets including Pica, Elite, Italics, Super/Subscripts, Proportional, Elongated, Condensed, and Italic Super/Subscripts.
- Standard 1.5K buffer.

Printer is covered with a two-year warranty.



Call for prices on the SP-1000A and other Seikosha printers.

Metric Industries Model 104 Interface with Modem Switch



The Model 104 is a serial to parallel interface with the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5″ × 2.5″ × 1.25″ and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.

Interface is covered with a one-year warranty.

Ordering Information

*Free shipping and insurance in the United States except Alaska and Hawaii.

Ohio residents add 5.5% sales tax.

Call (513) 677-0796 and use VISA, MASTERCARD or C.O.D.
or send check or money order to:

Metric Industries Inc.
P.O. Box 42396
Cincinnati, Ohio
45242

COCO CONSULTATIONS

Better to Leave EPROMs to Those in the Know

By Marty Goodma

• *I have been considering the Disto Super Controller and its associated EPROM Programmer. I do not know much about EPROMs or their applications. Can I put my existing software into EPROM? How do I install such EPROMs?*

Ricky Heavner
Miami, FL

In most cases EPROMs and EPROM programmers can only be fully used by folks who are familiar with the specifics of the Color Computer hardware and ROM software. It is possible to put commerical programs into EPROM, but a little tricky, and in most cases you gain little by doing so.

For more information, check the essay on EPROMs in the Hardware Hacking section of the CoCo SIG on Delphi.

• *The letters I, O, H, J, K, L, N and M have ceased to work on my old 64K 'F' board CoCo. Can you help me?*

Paul Grover
Plover, WI

These keys are all wired to Row 2 of the keyboard matrix layout. The most likely cause of your problem is a broken trace on the plastic keyboard connector. Unfortunately, this is very difficult to repair; a replacement keyboard is needed in this case. It is also possible, though less likely, that the connection is broken on the motherboard, either where the keyboard connector socket is soldered in or somewhere between that and its connection to the 6822 keyboard PIA.

• *When my computer is turned on it reads* `EXTENDED COLOR BASIC 1.1`. *But when I type* `EXEC 41175`, *I get back* `COLOR BASIC 1.2`. *Which version do I have?*

I am considering purchasing a Tandy Disk Drive 0 Package with one drive in it. Can I later add another drive acquired from a source other than Radio Shack? Are there any makes or models of drives you would recommend?

Robert H. Ruggley
Heyworth, IL

Color Computers have their BASIC operating system installed in three separate pieces: The Color BASIC ROM, the Extended Color BASIC ROM, and the Disk BASIC ROM. When turned on, the computer displays the copyright and sign-on message associated with the highest level ROM (Color BASIC is the lowest, and Disk BASIC is the highest). Thus, your computer has Version 1.1 of the Extended BASIC ROM. When you type `EXEC 41175` the computer shows the copyright and sign-on message in the Color BASIC ROM, a different part of the code. Thus, your computer's Color BASIC ROM is Version 1.2.

If you are referring to the current model Radio Shack Drive 0 package that has a one-half height drive in a full-height horizontal cabinet, then the answer is yes, you can add any of a wide variety of makes of bare di drives as a second drive, and have them bo fit in the cabinet and work just fine as Dri 1. Depending on the exact brand of dri you buy, you may encounter minor pro lems configuring the drive to make it thi it is Drive 1, or making the 34-pin connect reach to the circuit board of some mod disk drives. Both of these problems are easi solved.

Nearly any 40-track capable, 5½ in single- or double-sided drive should wo fine. Brands I have had good experienc with are TEAC model 54A single-sided a model 55B or 55BV double-sided, TE model 501 single-sided and model 5 double-sided, and double-sided Shugar Matshusita and Panasonic model 455.

Single-sided disk drives are no long being made and will soon be unavailable.

• *My 16K Extended Color BASIC respon with 8487 when I type* `PRINT MEM`. *Why this? How can I get the use of the full 16K*

Harold Harmo
Riverside, C

Although there is 16K of RAM in you computer, the BASIC operating system mus use a considerable portion of it in order t function. This is why when you type `PRIN MEM` you are told that roughly half of tha amount of memory is available for BASI programs and data use. You can get mor memory by typing `PCLEAR 1`, and still mor by typing `POKE 25,6:POKE &600,0:NEW`.

• *Is there a* `POKE` *on the Color Computer t inverse the screen?*

Jesus Padill
San Luis Potosi, Mexic

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Marty is the database manager of RAINBOW's CoCo SIG on Delphi. His noncomputer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

No. There is no simple way to generate verse video with a software POKE. But ere are software utilities available to do so.

How can I run my CoCo 2 off a 12 VDC ower pack like one used for a VCR? How n I get a service manual for my CoCo 2? he local Radio Shack was unhelpful.

Francis Crosby
Romulus, NY

A comprehensive service manual is available for all models of CoCo 2. All Radio hack stores should be able to order one for ou. The CoCo 2 service manual is also vailable directly from Radio Shack Naonal Parts. You can call them and ask for , giving them the catalog number of your omputer.

All models of CoCo 2 use pretty nearly the ame power supply. They generate an unregulated +10 volts at about 1.2 amps, and an nregulated -10 volts at about .2 amps. hese voltages are fed both to the SALT hip and the heat sunk pass transistor, and egulated to +5 volts using the regulation ircuitry in the SALT chip. The -10 volts is sed only inside the SALT chip and is equired for the cassette port and relay to vork and for the bit banger RS-232 port to vork. Everything else works off just 5 volts only. You can get the needed negative voltage using a small battery. A 9-volt alkaline battery should do. A more elaborate approach would be to get -10 volts out of the +12-volt battery using a switching DC to DC voltage inverter. You can get 10 volts by running the 12-volt battery through three or four diodes in series. Each diode produces a .5 to .6 volt drop.

CORRECTION

In the August "CoCo Consultations" column, I wrote some slightly misleading material regarding the PCLEAR 0 statement. While the expression PCLEAR 0 is not legal in BASIC, in Extended BASIC you can accomplish, in effect, a PCLEAR 0 (clearing all graphics pages from memory, freeing a maximum amount of RAM for BASIC programs) by typing:

```
POKE 25,6
POKE &H600,0
NEW
```

I implied that only a PCLEAR 1 was possible under Disk Extended BASIC. This was careless of me. For, as Art Flexser immediately pointed out to me on Delphi, a PCLEAR 0 under Disk BASIC can easily be accomplished by typing:

```
POKE 25,14
POKE &HE00,0
NEW
```

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

For quicker response time, your questions may also be posted in the FORUM section of RAINBOW's CoCo SIG on Delphi. In FORUM, type ADD and address your questions to the username MARTYGOODMAN. Marty is on most every evening to respond to FORUM messages. Other CoCo SIG members may also reply to questions posted in this public message area. Please be sure to leave your name and address in any FORUM questions, since those of wide interest will be selected for publication in this column.

S.T.A.G.
A GRADEBOOK
A full year gradebook. Track students not just for a semester, but for a full school year. Includes all the features you normally expect of a gradebook; weighted averaging of tests, homework scores, semester tests; correct, change or delete any student record; statistical analysis of scores; plus many more features not found in any other gradebook program. Included is a complete report writer for your printer. Frankly, we believe S.T.A.G. to be the best full year gradebook program on the market today. Write for details.
64k-Disk $35.00

SECA
TEACHER TESTED
P.O. BOX 3134
GULFPORT, MS 39505
(601) 832-8236
Ms. res. add 6% sales tax. Include $3 shipping/handling. Make checks payable to SECA. Dealers and authors inquiries welcome. No refunds or exchanges.
10 Free disk given for each program ordered.

THE WORD FACTORY'S
WORD MEANINGS
Captivating Graphic Game
New Word List Maker
Test Sheet Printer
1144 Words & Meanings
An aid for learning new words and their meanings. Create additional lists for game use or classroom printed tests. New lists created can be for any age grou-.
Grade 2-Adult. 64k-Disk
$24.98

PUZZLE MATH
Hi-Res graphic game for reinforcing addition, subtraction, multiplication, and division. Four levels of difficulty. Comes with 18 graphic pictures to start with. Add more if you wish. Each picture can be used as an 8 to 48 piece puzzle. A favorite with kids.
Grade 2-5. 64k-Disk $24.98

THE WORD FACTORY'S
SYNONYMS AND ANTONYMS
Hi-Res Graphic Game
New World List Maker
Test Sheet Printer
5760 Comb. Word List
An aid for learning synonyms & antonyms. Create additional word lists for game use or classroom printed tests.
Grade 2-Adult. 64k-Disk
$24.98

Plan-Net Forms
P.O. Box 1061
Wilkes-Barre, PA. 18702
Introduces
Label Master
We are pleased to announce the addition of the LABELMASTER to our line.
The LABELMASTER is compatible with ANY printer that can print text!!!
With LABELMASTER you can:
* Make customized diskette jackets! By using your favorite dump program, you may add your own personalized graphics design!
* Print jackets with the disk's directory, on the front cover!
* Print professional looking labels for your disks!
* Print Blank, or personally customized Cassette labels!
* Prepare and Maintain Mailing Labels! You may print an unlimited number of every label on the disk in one operation!
* Save Money!!! LABELMASTER'S DISK-TWIN will allow you to easily double the storage capacity of each diskette!
ORDER NOW!
Only $19.95
ALSO,
*** very high quality generic ssdd disks - $.85 each ***
NO QUANTITY LIMIT.
CREDIT CARD ORDERS, CALL (717) 821-2946
VISA
MasterCard
PLEASE ADD $2.00 S&H. PA ORDERS ADD 6% SALES TAX

This program makes it easy to use several different graphics programs without all the extension changing hassle

Picture File Extension Changer

By Jeff White

In recent years many new graphics programs have come on the market for the Color Computer, each with its own unique qualities. I find myself going from one to another quite often: using one program for drawing the basic outline of the picture, another to paint it and yet another to edit my mistakes.

Jeff White is a self-taught programmer and has had a CoCo for three years. He is president of the Carrollwood CoCo Club and owner of Merlin's Software. Jeff lives in Tampa, Florida.

The problem with this is that they all use different extensions to load and save the files. It is a hassle to rename the file each time you go from one to another, particularly when you have a whole disk of files and each one must be renamed. I went to work to solve this problem and *Picture File Extension Changer* was the result.

This program changes individual file extensions or it can do an entire disk at once. It is menu driven and easy to use. The first thing that appears when run ning the program is the title screen. used *Maxcmp* to convert the file t ASCII so I could merge the file with th title. You are asked if you need instruc tions.

The main menu appears next an there are seven options to choose from The most popular extensions are use for options one through six. Optio seven allows you to enter whateve extension you want. After selecting on of the choices, you are asked whethe you want to rename all of the files o

		1260	136	1910	81
260	192	1360	133	1990	197
420	203	1520	213	2080	189
600	137	1640	3	2170	134
840	24	1730	203	2260	182
1070	178	1820	195	END	126

Editor's Note: The following listing must be entered exactly as it appears in the magazine. To generate the underscore(_) use SHIFT-up arrow. To generate the backslash (\) use SHIFT-CLEAR.

The listing: EXTCHNGR

```
10 'PICTURE FILE
    EXTENTION CHANGER
20 'BY JEFF WHITE
30 '(C) 1986
40 '
50 '
60 'MERLIN'S SOFTWARE
70 '1304 FOUR SEASONS BLVD.
80 'TAMPA, FLA. 33613
90 '(813) 971-4451
100 B=3:CLS(B)
110 PMODE4,1
120 POKE179,1
130 PCLS
```

rename individual files. If you choose files, every file with that extension ll be changed. Be careful when in this ode; if you are changing files with BIN tensions, *all* files with BIN extensions ll be changed, not just picture files.

Next, you are asked to enter the drive mber of the disk you want to rename.

If you chose to rename all files earlier, it renames all selected extensions to the new extension. If you chose to rename individual files, a menu of all the files appears. Just enter the number next to the file you want to rename and it does it. When finished, press 'Q' to quit.

After quitting, you are asked if you want to do another disk. If so, it returns to the main menu. If not, the program ends.

(Questions about this program may be directed to Mr. White at 1304 Four Seasons Blvd., Tampa, FL 33613. Please enclose an SASE when writing.) ☐

```
140 SCREEN1,1
150 GOSUB1510
160 FORT=1TO900:NEXTT
170 PMODE4,1:SCREEN1,1
180 FORI=1 TO 152:LINE(0,I)-(256
,I),PRESET:NEXT
190 A$=INKEY$:IF A$="" THEN 190
200 FORI=192 TO 152 STEP-1:LINE(
0,I)-(256,I),PRESET:NEXT
210 IF A$="Y" THEN 1240
220 CLEAR2000
230 B=3
240 DIM C$(11),PIC$(68)
250 CLS(B)
260 PRINT" picture file extentio
n changer"
270 POKE1024,32:POKE1032,32:POKE
1037,32:POKE1047,32:POKE1055,32
280 PRINT@96,"1. RENAME <BIN> TO
 <MAX>"
290 PRINT"2. RENAME <MAX> TO <BI
N>"
300 PRINT"3. RENAME <BIN> TO <PI
C>"
310 PRINT"4. RENAME <PIC> TO <BI
N>"
320 PRINT"5. RENAME <BIN> TO <PI
X>"
330 PRINT"6. RENAME <PIX> TO <BI
N>"
340 PRINT"7. RENAME <ANOTHER <EX
T>"
350 PRINT@185,"pick a";:PRINT@21
7,"number"
360 POKE1213,32
370 O$=INKEY$:IF O$="" THEN 370
380 IF O$="1" THEN OE$="BIN":NE$
="MAX"
390 IF O$="2" THEN OE$="MAX":NE$
="BIN"
400 IF O$="3" THEN OE$="BIN":NE$
="PIC"
410 IF O$="4" THEN OE$="PIC":NE$
="BIN"
420 IF O$="5" THEN OE$="BIN":NE$
="PIX"
430 IF O$="6" THEN OE$="PIX":NE$
="BIN"
440 IF O$="7" THEN PRINT@352,"";
:INPUT"OLD EXTENTION";OE$:PRINT@
352,"                    ":PRIN
T@352,"";:INPUT"NEW EXTENTION";N
E$
450 O=VAL(O$)
460 IF O<1 OR O>7 THEN 370
470 PRINT@352,"RENAME (1)ALL OR
(2) INDIVIDUAL?";
480 R$=INKEY$:IF R$="" THEN480
490 IF R$="1" THEN A=1:GOTO520
500 IF R$="2" THEN A=2:GOTO520
510 GOTO480
520 PRINT@448,"             (ENTER
)= 0"
530 POKE1471,95
540 PRINT@416,"";:INPUT"ENTER DR
IVE NUMBER (0,1,2,3)";K
550 IF K<0 OR K>3 THEN 530
560 DRIVE K
570 CLS(B)
580 GOSUB800
590 'RENAME INDIVIDUAL FILES
600 PRINT@392,"enter the number"
;
610 PRINT@425,"of the picture";
620 POKE1425,32:POKE1421,32
630 POKE1448,32:POKE1451,32:POKE
1455,32:POKE1463,32
640 PRINT@456,"to be renamed";
650 POKE1482,32:POKE1485,32:POKE
1493,62
660 POKE1494,32:POKE1495,32
670 PRINT@488,"type (q) to quit"
;
680 POKE1516,32:POKE1517,60:POKE
1519,62:POKE1520,32:POKE1523,32
690 PRINT@470,"";:LINE INPUT"";F
$
700 FORT=1496TO1503:POKE T,62:NE
XT
710 IF F$="Q" THEN 1140
720 F=VAL(F$)
730 IF F<1 OR F>C THEN 660
740 CLS(B)
750 PRINT@192," ";PIC$(F);" IS
NOW BEING RENAMED"
760 P$=PIC$(F)+"/"+NE$
770 RENAME PIC$(F)+"/"+OE$ TO P$
780 GOSUB800
790 GOTO600
800 'GET FILE NAMES
```

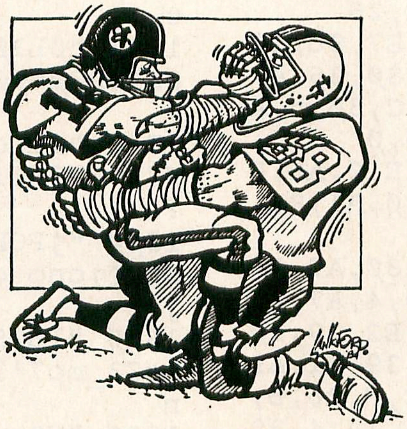
```
810 FOR X = 3 TO 11
820 DSKI$ K,17,X,A$,B$
830 IF (LEFT$(A$,1)=CHR$(&HFF))
THEN 850
840 C$(X)=A$+LEFT$(B$,127):NEXT
X
850 X=X+1:C=1
860 FOR Y = 3 TO X:FOR Z=0 TO 7
870 IF MID$(C$(Y),Z*32+9,3)<> OE
$ THEN 920
880 PIC$(C)=MID$(C$(Y),Z*32+1,8)
890 L$=LEFT$(PIC$(C),1)
900 IF (L$=CHR$(0) OR L$=CHR$(&H
FF)) THEN 920
910 C=C+1
920 NEXT Z:NEXT Y
930 IF A=1 THEN GOSUB1030
940 C=C-1
950 IF C=0 THEN 1470
960 MID=INT(C/2)+1
970 CLS(B):TAB=1
980 FOR D = 1 TO C
990 PRINT@TAB,USING"##";D;:PRINT
".--> ";PIC$(D);
1000 TAB=TAB+32:IF D=MID THEN TA
B=16
1010 NEXT D
1020 RETURN
1030 'RENAME ALL FILES
1040 FORD=1 TO C-1
1050 IF C=1 THEN 1470
1060 PRINT@224,"<"+OE$+"> FILES
NOW BEING RENAMED TO<"+NE$+"> FI
LES."
1070 P$=PIC$(D)+"/"+NE$
1080 RENAME PIC$(D)+"/"+OE$ TO P
$
1090 NEXTD
1100 CLS
1110 DIR
1120 PRINT@384,"ALL <"+OE$+"> FI
LES HAVE NOW BEEN   RENAMED TO <
"+NE$+"> FILES."
1130 GOTO1160
1140 CLS:DIR
1150 PRINT@384,"ALL SELECTED <"+
OE$+"> FILES HAVE   NOW BEEN CHA
NGED TO <"+NE$+"> FILES."
1160 PRINT@448,"DO YOU WISH TO D
O ANOTHER DISK?            (yes
/NO)          ";
1170 FORT=1TO300:NEXT
1180 PRINT@448,"DO YOU WISH TO D
O ANOTHER DISK?            (YES
/no)          ";
1190 FORT=1TO300:NEXT
1200 A$=INKEY$:IF A$="" THEN1160
1210 IF A$="Y" THEN 220
1220 IF A$="N" THEN 1230 ELSE 12
00
1230 POKE113,0:EXEC40999
1240 'INSTRUCTIONS
1250 CLS(B)
1260 PRINT"                INSTRUCTION
S       ";
1270 PRINT" MANY NEW GRAPHIC PRO
GRAMS HAVE COME ON THE MARKET RE
CENTLY THATUSE EXTENTIONS OTHER
THAN THE   STANDARD <BIN>. THERE
 MAY BE    ";
1280 PRINT"TIMES WHEN YOU WOULD
LIKE TO USEA FILE FROM ONE BUT I
T HAS TO BERENAMED BECAUSE OF TH
E EXTENTION";
1290 PRINT"DIFERENCE. MANY TIME
S YOU MAY  WISH TO WORK ON A FUL
L DISK OF  FILES BUT YOU WOULD H
AVE TO GO   ";
1300 PRINT"AND RENAME EVERYONE.
WELL THIS  PROGRAM WILL HELP YOU
 OUT.    ";
1310 PRINT@448,"   PRESS SPACEBA
R TO CONTINUE  ";
1320 EXEC44539
1330 CLS(B)
1340 PRINT" PICTURE FILE EXTENTI
ON CHANGER WILL CHANGE THOSE EXT
ENTIONS FORYOU. THE PROGRAM IS M
ENU DRIVEN AND VERY EASY TO USE.
 YOU HAVE A";
1350 PRINT"CHOICE OF RENAMING AL
L OF THE   FILES OR SOME OF THE
FILES. "
1360 PRINT" IF YOU CHOOSE TO REN
AME ALL THEFILES IT WILL CHANGE
EVERY <BIN>FILE ON THE DISK SO C
HECK TO    MAKE SURE ALL THE FIL
ES ON THE  DISK ARE PICTURES."
1370 PRINT:PRINT
1380 PRINT@448,"   PRESS SPACEBA
R TO CONTINUE "
1390 EXEC44539
1400 CLS(B)
1410 PRINT" IF YOU CHOOSE INDIVI
DUAL YOU   CAN PICK WHICH ONES Y
OU WANT TO CHANGE. BASIC FILES A
RE IGNORED IN BOTH CASES."
1420 PRINT" THAT IS ABOUT ALL YO
U NEED TO  KNOW. I HOPE THIS PRO
GRAM IS AS HANDY TO YOU HAS IT H
AS BEEN FORME."
1430 PRINT:PRINT:PRINT:PRINT:PRI
NT
1440 PRINT@448,"   PRESS SPACEBA
R TO CONTINUE "
1450 EXEC44539
```

Orders
800-628-2828
Ext. 850

Information
301-521-4886

The Handicappers!

The Pros



Tired of wrestling with Sunday point spreads? Let your Color Computer do it for you! Pigskin Predictions, the best-selling NFL handicapper, is ready for 1985. Spend a few minutes typing in scores each week, and here's what it will do:

- Menu-driven selection of schedules, ratings, division races, predictions or results by team or week. Seven different reports available.
- Easy once-a-week entry of scores–no complex, meaningless stats.
- Predicts scores of all games for remainder of season each week!
- Calculates projected won-lost records for all weeks.
- Maintains home field advantage and power ratings for all teams.
- 1985 schedule data file included free.
- 32/64K enhanced version features dazzling Rainbow Writer Screen display. Seeing is believing! Standard 16K version included, too.
- You'll be amazed at the power of this program. 16/32K ECB required (32K for disk). Only $39.95 on tape or disk. 1985 Data tape or disk for previous owners, just $13.95.

College

After two years of searching, we've finally found a college football handicapper! We think it's a winner! The Lockmaster® maintains stats on 105 major college teams, analyzes the local point-spread, and rates the game as a betting proposition. Why waste your efforts on games with marginal chances of success, when you can get your Color Computer to pick the games that are most likely to make you a winner?

To use the program, all you need are the College Football ratings that appear each week in USA Today. You can run individual games (including bowl games), update team stats and customize each game's rating with critical information such as coaching and quarterback changes and injuries to key players.

Using the weekly stats and our mathematical formula (which includes schedule difficulty, power ratings, offense and defense), The Lockmaster rates each game against the current point spread and tells you how sure the bet is.

The Lockmaster is easy to use and menu driven. It includes complete instructions and data file for 105 major college teams. 32K/64K Disk only. Just $39.95.

Thoroughbred, Harness, Greyhound

HORSE RACES

HARNESS RACES

Use your **Color Computer** to improve your performance at the track! These 16K programs for **Thoroughbred, Harness** and **Greyhound** racing rank the horses or dogs in each race quickly and easily, even if you've never handicapped before. All the information you need is readily available from the Racing form, harness or dog track program. We even provide diagrams showing you where to find each item!

Thoroughbred factors include speed, distance, past performance, weight, class, jockey's record, beaten favorite and post position. **Harness factors** include speed, post position, driver's record, breaking tendencies, class, parked-out signs and beaten favorite. **Greyhound factors** include speed, past performance, maneuvering ability, favorite box, class, kennel record, beaten favorite and breaking ability.

We include complete instructions and a wagering guide that tells you which races to bet and hwich to avoid—one of the real secrets of good handicapping. You can buy a more expensive handicapper, but we don't think you can buy a better one! **Thoroughbred, Harness** or **Greyhound Handicapper,** $39.95 each on tape or disk. Any two for $59.95 or all three for $74.95.

VISA **Federal Hill Software 8134 Scotts Level Rd. Baltimore. Md. 21208** MasterCard

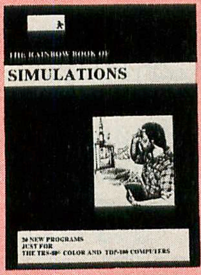
```
1460 GOTO 220
1470 CLS(B):DIR
1480 PRINT:PRINT"THERE ARE NO <"
+OE$+"> FILES ON DISK"
1490 FORT=1TO4000:NEXT:GOTO220
1500 'TITLE PAGE DATA
1510 FOR X=&H7E00 TO &H7E95
1520 READ H$:POKE X,VAL("&H"+H$)
:NEXT
1530 DATA 9E,33,30,6,10,8E,5E,0,
86,8,A7,8C,3A,86,6,A7,8C,34
1540 DATA A6,80,80,30,48,48,48,5
9,6A,8C,29,27,E,6A,8C,25,26
1550 DATA F4,E7,A0,C6,8,E7,8C,1C
,20,EB,86,6,A7,8C,14,A6,80,26,A
1560 DATA A6,4,81,22,26,C,30,5,A
6,80,80,30,48,48,20,D9,0,0
1570 DATA 8E,5E,0,10,8E,E,0,A6,8
0,A7,8C,42,6F,8C,40,A6,80,A1,8C,
3A
1580 DATA 26,F,E6,80,A6,80,A7,A4
,8D,10,8D,1D,5A,26,F7,20,4,A7,A4
1590 DATA 8D,5,8D,12,27,E2,39,10
,8C,25,E0,24,4,31,A8,20,39,31,A9
1600 DATA E8,21,39,6D,8C,F,26,B,
10,8C,25,FF,26,3,6C,8C,4,1A,4,39
1610 READ Z:EXEC&H7E00
1620 RETURN
1630 DATA1
1640 "j^X40>ZB3nX40>XR3nX80>XIoo
cmo?cZ3OoloOcljPgojSOljP[oo?Wbm^
C
1650 "Zl>cTi_;an?cZlooZl03Z8_oZ2
03Z6Ol0oflPIVMVI65oHFlTIVMWIV3o0
0
1660 "3Z3Ol00>X:onX4o^XOooc''>X5
0>X:ocl0?V5QHVlPI6EQ?000?nX7onX4
0
1670 "?ooo_cmoOcloooooo?glo>XConX
80>XIo'o7ifLW00NAT9bNWQl7YRIThLL
0
1680 "0>X=o'00jP[o7'll0020h?3'l>
3Ph<2'^;RHh?cloOgno_oon?SoookPP>
X
1690 "90>X:o'm78c<A6AUI6A4a8d<73
nX7onX40?n78?iSHF7Zl6EQoP00jQ?oj
P
1700 "P0jQko0=n4a<QXLC5aFIR<3=l0
0>X=o'00h>X4l>X8n60Hl0?Zl00LOWUg
K
1710 "fl_=cTmoOcm3NGSL003l'DllPL
7l'0l0@000>X;ooklnO_inOgmoOWkn?S
Z
1720 "2?oZl03ooglo?'2OjPBa<ah0@>
XConX80>XKoo3di0'o30cZ2>'_9b0'jP
g
1730 "ojQ<0'20N0@000=k_knoL?oomO
I_S'80oOooolg>c@Z60Kooi0000jP_o0
8
1740 "oZl9VKSH6AcP00jPSojP@0jPGo
?aoZl9lO7cmojQ?ojPP0jQko?SPc=^K\
k
1750 "nc\k0I7P'0H?^X=o'0000P8420
Q@T;ZlH@4002 4Q8@4onX40=blO9RHn?S
m
1760 "oO]i<023klR69UShn7RHh?P000
3Z2ol07[>c\ijc\k<c7Pl0jPSojP@0oo
n
1770 "2<W8b<[:b\;6bW83lk^3PjQ3oj
PP0oon0_hb<jPK\k^gZlNb<_h20jPOo0
o
1780 "0L30H6oP00N28<n>0llnX=o'00
02l0P80000410'<7l'l?3alO7ogZl@0O
7
1790 "fm_ccoZl?lO?oooo';Z303Z2om
0729PK7KZl6Hl003Z2?oZl03oo'o?cl3
?
1800 "jPCHfLn00lloOnX@onX80?oo0o
0<l^;cno_cIPkll003oooZl3oZlooPbA
]
1810 "l6lSZlUTHOP00jPgo000?3aloO
goZ3_mo7'l?7nX@oclo0NX90>X<onX;O
n
1820 "X9onX40>X5o'2<g<c<c8d6033Z
4ooZ203oon3\K60P<2@<70'<K6cZl>b<
_
1830 "h20jPOoln?a>AVIjPKI67h00>X
=o'4ljRci6@Ta@D7Zl07Z8?oZl03ZlOl
7
1840 "IfMWHNUaH@<7jQ?ojPP0jPOon>
?<f9Ra\K>c\IRL3'<P>>X4on7YbAQn6l
S
1850 "Zl]WHf5m>@63Z3oollNO[jn?Sn
o_khnoPh>Y7onX40?ool>O[jn;Rn_[jh
^
1860 "cPh>XConX80>X6ooh0hg0'4X;2
o_k2TS;RPPHOooo'm_K'l7QbIVkVi^X4
m
1870 "QJFlQl0@>X?ocl4hC4'<N?ZllW
a003ZAooZl03ooc0FQ<CTM3'L34ATL?3
o
1880 "o_cino;Zl?KbloWho?kooooZ20
3Zl?l?Cdo2l\;2jPK?'<ChL043oooZlG
m
1890 "lLFI\C5QHFEUHC4'6PA0LjQ3o?
clo48J>QhJFY\H00>Y7onX40?ooOgmo0
7
1900 "c5bM7SaGP00?lOWalO?cmoOglo
?anO7aooooooZ203Zlol6iVIVjPIWHW0o
7
1910 "X30jPOoln4H34cVi_Kfi^a<6>0
llnXCo'=c\c<'=3P'0@?ZAooZl03ZlOl
0
1920 "nH^CXlN;l@00oon2<W8b<[:b\;
6bW83lk^3PonX80>X7o'KTHF=QHNX4IF
7
```

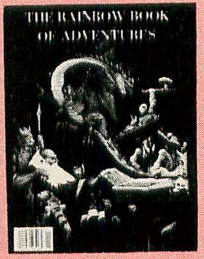
```
1930 "aHD<02>X7on396g'H6>X6FAQn0
03Z8_olnO?gjPKcl?SZ=_oZ103oh<kHf
l
1940 "Wi6ATH>EZD003oo'oZ2\n?3alo
OooZ203Z1ol0W;k6P83Z1Yn7i'L7jPOo
l
1950 "n?a>AVIjPKI67h00>XRoclo0<L
<30'\C8L04>XQon68?eUI6AoHf=PHO'0
0
1960 "jPOojP@0ogmnO7gmo?cojP@oOo
oon?[bm>CXb=6AXj>7QnX5onX80>X7oo
l
1970 "7630'H7mPH6<a>9n7'?3Z4ooZ1
7oZ9?lOcnX4Kln?3aoZ1OolnO[jn?Sno
_
1980 "khnoShjQ3o80bLS8'<jPC<Q'0@
noShjPCojP@0ool3lc<b<36'\;:d^820
o
1990 "gmnO7emo?cooooloOcljPCojPP
0jPOo7hOWHc<cl'<3'a=S''L??nX7onX
;
2000 "o^Xho'clhoFiTH6lWIdM73cZ4?
n3jPJc<g>c<b=3Q'lOjPCojP@0jPGo0<
k
2010 "Fi\K6alH00?ool^9'N5a>Ad=1B
8'>7^X4onX80>XIoo37V31QHlO7jPG?a
f
2020 "MS<AR7'?3Z<ol?chn0Qhb<S9b]
aP00jQ3ol>OYjN7QjPGmnN;\h>3Z1?oZ
l
2030 "03Z1Ol0?69P?8I6?000ool?chn
?jPNO7aoZ1?oZ203oon3_hn?Z3O_Skn3
P
2040 "ool7hW0a4832jPOn'Y8bL><00>
Xfo'3SIFlPj75R003Z3oo'l9n\[8b?jP
B
2050 "<_'00?goZ1OoZ103ooon79f3iH
f5QIFUa003oQj>AVLS<k>c\b=RAXH>7o
o
2060 "oojPP0ool0oPL3<CP'90cl30@P
<3lo?'o?3'ooo'm?clo?'<oOhL34jPK>
'
2070 "?<00>Xfob49TN5S\lX<063Z3oo
l0NL[2'>36'>C8lh00>X7onX40>X5o'2
c
2080 "ah>3Rl^92lcZ4ooZ203oof0\;2
0P<2C<g<c<jPK\S;n0P>X7oclLRL_;b<
S
2090 "<bL_;bl?a003Z3OoZ;_cZ17cZ1
OcZ2olo0?T:0P3PlPHn>3\hN>X7onX40
>
2100 "X5o'0H6ATI>efH003Z4ooZ203o
oo3Tc=c<c>X;k0'o003Z1ol0O8h6lPhf
a
2110 "XH63Qkg''08jPgo003Z17X2o'8
2NWYjN03l00;Z17X2o'82jPAj0_l20^X
4
2120 "NP;o0P;Z17X2o^X70>X;o'm0o\
;0'?Wl'Lo?S'lOjPOojP@0ooooo_'lnh
V
2130 "lPHVAh@04jQ?ojPP0jPOon>?<f
9R'_k2'\IRL3'<P>>X7ooQbAUm6A^X5M
Q
2140 "J67'00jPgo003Z17X2o'82NWYj
>P830000@6lP0<0000lPL70''000Ng]i
N
2150 "0;o00ljNWQ0jPT0jPcoOWamO7c
Z2?kZ1ooZ103ooo0DU83VSXJ6UZK7003
Z
2160 "4ooZ203Z1ol?'g<a6AWi0@7QRC
7QP'LOjPOo0GSl3PHVjPIflYl00>X=o'
0
2170 "0061PH03P003Z1700l00'20Hl0
000>?cbkmoOGfmbNo_hna\;a'00lfL;0
P
2180 "d>3'l00'<00>X<o'o>c\k0a<cL
kLn>003Z1ooZ103Z1Om07c4a<G6c7P00
j
2190 "Q?ojPP0jQkon>=<F5QIF4a7IVa
_lh'H6<c7h?3Z2OoZ2'3Z1@40000lPD4
l
2200 "0'000;cOgmjiOookncO7P0lnoo
ooinIVQD<0gooc003Z3?l0An][HfM['h
<
2210 "33RlPjPOojP@0jPGo0lVjW9RH6
lP0@>XConX80>XNo'OP?lRHf9P'h082l
?
2220 "PL3<'Hh047jPWo00082l0@8D52
Q8CZ1PP000P820WnjP@0^7Sh<37'l?[j
l
2230 "_9P00;JT0a<\?3'l330l000jP_
oh0kZ1lSh6API6Q'0@>X7onX40>X5o'3
7
2240 "c<c7d>S7003Z4ooZ203Z7_oPSc
5PH<3o'<37HW0o3X3PjPgo000P@420jP
@
2250 "0jP@23'826QXj>P;kjPD0>P;O'
X;Z17X2?'82NW[Z303Z2omo0GRHVlPHf
A
2260 "PI6Qa0'>X7onX40>X5oan?C'n?
cln?3aoZ4ooZ203Z7_ll2L?7Hf?S0'>3
8
2270 "l>3lal'jPgo00022QX2O'82jPA
j0_l20^X4NP;o0P8J6SYj0_l20^X4NP;
o
2280 "0P;Z17X20nX80>X<o'loS8'<3>
'\;0'h087Z1ooZ103ool2N8d<3l^cXh>
7
2290 "YhN7Z4ooZ203Z7_ll>7b<003Z1
Sl?c'l?jPgo0NX4N@7m0@7Z17Tlo@4lj
P
2300 "Ai0Odl0NX4N@7m0@7Z17Tlo@4l
NGUiL@7a0@5QPH4l0@7Z2ooQ2;mHFlPO
f
2310 "=SI67l00>X7onX40?ooOnX6?go
Z6?oZ203ZO_l?cdl?3clolbM7Q'lOjPO
o
2320 "jP@0jR;ojPP0jY;'jP@0jR;'jP
@0Y
```

Recommended Reading for Your CoCo from . . .

The Rainbow Bookshelf

THE COMPLETE RAINBOW GUIDE TO
OS-9
By Dale L. Puckett and Peter Dibble


THE RAINBOW BOOK OF
SIMULATIONS
20 NEW PROGRAMS JUST FOR THE TRS-80 COLOR AND TDP-100 COMPUTERS



THE SECOND RAINBOW BOOK OF
ADVENTURES

The Complete Rainbow Guide To OS-9

The book that demystifies the state-of-the-art operating system for the Tandy Color Computer. Authors Dale L. Puckett and Peter Dibble show you how to take advantage of OS-9's multi-tasking and multi-user features, and the capability of redirecting input and output commands at will. An easy-to-read, step-by-step guide packed with hints and tips, tutorials and free software in the form of program listings.

Book $19.95, Disk $31.00 (2 disks, book not included)

The Rainbow Book of Simulations

Features 20 award-winning entries from THE RAINBOW's first Simulation programming competition. You are the Commander-in-Chief of the Confederate Army during the Civil War, an air traffic controller at one of the nation's busiest airports, the owner of your own software business, a civil defense coordinator in charge of saving Rainbow City from a raging flood, a scientist conducting experiments on Mars . . . Your wits are on the line.

Book $9.95, Tape $9.95

The First Rainbow Book of Adventures

A collector's item containing 14 winning programs from THE RAINBOW's very first Adventure contest. Includes such favorites as *Sir Randolf of the Moors, Search for the Ruby Chalice, Deed of the York, Horror House, One Room, The Door* and *Dr. Avaloe*. Plus, hints and tips on solving Adventures.

Book $7.95, Tape $7.95

The Second Rainbow Book of Adventures

Our newest arrival features 24 of the most challenging Adventure games ever compiled. Meet the Beatles and battle the Blue Meanies, find a hidden fortune, or win the heart of a beautiful and mysterious princess. Experience the thrills and chills of the most rugged Adventurer without ever leaving your seat. *Ring Quest, Secret Agent Man, Dark Castle, Curse of Karos, Island* and more!

Book $13.95, Tape $13.95

Coming soon
The Rainbow Guide to Introductory Statistics
The Second Rainbow Book of Simulations

For greater convenience, order RAINBOW Books and Tapes through the shopping area of the CoCo SIG of Delphi!

I want to start my own Rainbow Bookshelf!

Please send me:

☐ The Rainbow Book of Simulations	$ 9.95	______
☐ Rainbow Simulations Tape	$ 9.95	______
☐ The Complete Rainbow Guide to OS-9 (book only)	$19.95	______
☐ Rainbow Guide to OS-9 Disk Package (2 disks)	$31.00	______
☐ The Rainbow Book of Adventures (first)	$ 7.95	______
☐ Rainbow Adventures Tape (first)	$ 7.95	______
☐ The Second Rainbow Book of Adventures	$13.95	______
☐ Second Rainbow Adventures Tape	$13.95	______
Kentucky residents add 5% sales tax		______
Add $1.50 per book Shipping and Handling in U.S.		______
Outside U.S., add $4.00 per book		______
(Allow 6 to 8 weeks for delivery)	Total	______

Name ______

Address ______

City ______

State ______ ZIP ______

☐ Payment Enclosed, or ☐ Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ______

Card Expiration Date ______

Signature ______

Mail to: Rainbow Bookshelf, The Falsoft Building, P.O. Box 385, Prospect, KY 40059.

Please note: The tapes and disks offered by The Rainbow Bookshelf are not stand-alone products. That is, they are intended to be an adjunct and complement to the books. Even if you buy the tape or disk, you will still need the appropriate book.

OS-9® is a registered trademark of the Microware Systems Corporation.

To order by phone (*credit card orders only*) call 800-847-0309, 8 a.m. to 5 p.m. EST. For other inquiries call 502-228-4492.

* * *

CoCo Community

We have compiled a list of Color Computer Clubs because of the many requests we have received. CoCo Clubs may wish to exchange newsletters, share ideas for topcs of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our "agreement form" will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

* * *

RIZONA

ucson Color Computer Club, Bill Nunn, 9631 E. Stella, Tucson, 85730, (602) 721-1085

CALIFORNIA

Color America Users Group, Mark Randall, 2227 Canyon Road, Arcadia, 91006, (818) 355-6111

os Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213, (213) 838-4293

California Computer Federation, (San Fernando Valley Chapter), Pete Ellison, 366 West Providencia Ave., Burbank, 91506, (818) 840-8902

California Computer Federation, (San Francisco Chapter), Art Murray, P.O. Box 7007, Redwood City, 94063, (415) 366-4560, BBS (415) 364-2658

The Davis CoCoNuts, Shneor Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

South Bay Color Computer Club, Patricia Scheffer, 1435 W. 172nd Street, Gardena, 90247, (213) 371-2016

South Bay Color Computer Club, Bill Tillerson, 73 Alamitos Ave., Suite 2, Long Beach, 90802, (213) 432-3037

Ventura County Color Computer Club (VC4), Doug McLaughlin, Oxnard Public Library, 214 South "C" Street, Oxnard, 93030, (805) 984-4636 or BBS (805) 484-5491

Citrus Color Computer Club, Jack Brinker, P.O. Box 6991, San Bernadino, 92412, (714) 824-1866

South Bay Color Computer Users Group, John G. Say, 3117 Balmoral Drive, San Jose, 95132, (408) 923-2967

COLORADO

The ESCO Computer Club, David E. Schulz, 1299 Harrison Street, Denver, 80206, (303) 388-6988

DISTRICT OF COLUMBIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, Virginia 22193, (703) 690-2453

FLORIDA

Northwest Florida CoCo Nuts, Lee Gottcher, P.O. Box 1032, Fort Walton Beach, 32549, (904) 678-8894

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

CoCo Chips Color Computer Club, 715 5th Avenue NE, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, George Aloia, 2263 N.W. 65 Avenue, Margate, 33063, (305) 972-0975

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

Color-6809 Users Group, Emery Mandel, 4301 11th Avenue North, St. Petersburg, 33713-5207, (813) 323-3570, BBS (813) 321-0397

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33583, (813) 921-7510

GEORGIA

The Northeast Atlanta Color Computer Club, Joe Novosel, P.O. Box 450915, Atlanta, 30345, (404) 921-7418

Atlanta Color Computer Users Group, Terry E. Love, 5155 Maroney Mill Rd., Douglasville, GA 30134, (404) 949-5356

ILLINOIS

Illinois Color Computer Club of Elgin, Tony Podraza, 119 Adobe Circle, Carpentersville, 60110, (312) 428-3576

Northern Illinois Color Computer Club, Kenneth Trenchard, Sr., 6145 N. Sheridan Road 30, Chicago, 60660, (312) 973-5208

Willow-Works Club, Kevin L. Adair, 5753 S. Laflin, Chicago, 60636, (312) 737-5716

Peoria Color Computer Club, Harold E. Brazee, 102 Twin Oak Court, East Peoria, 61611, (309) 694-4703

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Kitchen Table Color Computer Group, Robert Mills, P.O. Box 464, Hanover, 61041, (815) 591-3377

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, John Chasteen, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

INDIANA

Three Rivers Color Computer Club, R.R. 3, Box 269, Angola, 46703

CoCo Program Exchange, Erik Merz, 3307 Arrow Wood Dr., Fort Wayne, 46815, (219) 749-0294

Indy Color Computer Club, Kevin S. Jessup, Sr., P.O. Box 26521, Indianapolis, 46236, (317) 873-5808

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

IOWA

CoCo Questers, Scott Bellman, 2420 Salem Court, Bettendorf, 52722, (319) 359-7702

Metro Area Color Computer Club (MACCC), David E. Hansen, 3147 Avenue J, Council Bluffs, 51501, (712) 323-7867

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

KANSAS

KC CoCo Club, Gay Crawford, P.O. Box 11192, Kansas City, 66111, (913) 764-9413

Micro 80 Users Group, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, William Wales, 220 East Harry St., Lloyd Electronics, Wichita, 67220, (316) 685-9587, BBS (316) 685-8752

KENTUCKY

Perry County CoCo Users Group, Keith W. Smith, General Delivery, Hardburly, 41747, (606) 439-4209

LOCO-COCO, Jim Spillman, 2405 Woodmont Dr., Louisville, 40220, (502) 454-5331

LOUISIANA

Cajun CoCo Club, Rick Herbert, P.O. Box 671, Crowley, 70526, (318) 788-3148

MASSACHUSETTS

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

Massachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

CLUB 6809, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

CCUG (Color Computer Users Group), Rich Van Manen, O-599 Lake Michigan Dr., Grand Rapids, 49504, (616) 453-8351

Grand Rapids Area Tandy Users Group, Robert M. Worth, Jr., 1726 Millbank S.E., Grand Rapids, 49508 (616) 245-9324

Greater Kalamazoo Color Computer Club, Jim Rix, 1835 Chevy Chase Blvd., Kalamazoo, 49008, (616) 344-7631

Greater Lansing Color Computer Users Group, P.O. Box 14114, Lansing, 48901

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

MISSISSIPPI

Singing River C.C. Club, Mark Welch, 3605 Vancleave Rd., # 118, Gautier, 39553, BBS (601) 875-8688

Gulf Coast Color Computer Assoc., Ed Keels, 22 Christy Cove, Gulfport, 39503, (601) 832-1210

CoCo Art Club, Joel Bunyard, Rt. 16, Box 11, Meridian, 39301, (601) 483-0424

MISSOURI

North County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, 1610 N. Marlan, Springfield, 65803

NEBRASKA

Siouxland Color Computer Club, Alan Pedersen, 611 D Street, South Sioux City, 68776, (402) 494-2284

NEVADA

C.A.T. F.U.N., Paul A. Osborne, 201 Miners Road, Fallon, 89406, (702) 423-5789

NEW HAMPSHIRE

CoCo Nuts, Matthew Pietrusewicz, R.F.D. #1, Box 548, Pelham, 03076, (603) 635-7098

NEW JERSEY

West Orange CoCo Club, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748 (let ring 12 times)

Loco CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

NEW MEXICO

Chaves County Color Computer Club, Lee Mitchell, 1102 Melrose Drive, Roswell, 88201, (505) 623-0789

NEW YORK

Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4125, Albany, 12204, (518) 465-9793

Adirondack CoCo Club, (Greene County Chapter), Pete Chast, P.O. Box 61, Athens, 12015, (518) 945-1636

Adirondack CoCo Club (Glens Falls Chapter), Richard Mitchell, 39 Center St., Fort Edwards, 12828

Island Color Computer Club, Joseph Castelli, P.O. Box 901, Bellmore, 11710, BBS (516) 783-7506

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 13357, (315) 895-7730

Rockland County Color Computer Users Group, Harold L. Laroff, P.O. Box 131, Monsey, 10952-0131, (914) 425-2274

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 933-7488, BBS (716) 933-7489

The Rochester S-80 Computer Club, Inc., Gary Panepinto, P.O. Box 15476, Rochester, 14615, (716) 392-6133

New York Color Computer User Group, Carl Glovinsky, 15 Bolivar St., Staten Island, 10314, (718) 761-0268

NORTH CAROLINA

Bull City CoCo Users Group, Todd Wall, 5319 Durand Drive, Durham, 27703, (919) 598-1348

Raleigh Color Computer Club, David Roper, P.O. Box 680, Garner, 27529

OHIO

Central Ohio Color Computer Club, Jim Upperman, 5201 Wilcox Road, Amlin, 43002, (614) 876-1767

Color Computer Club, Inc., William Wills, P.O. Box 468, Canfield, 44406

Dayton Color Computer Users Group, Steven E. Lewis, 4230 Cordell Dr., Dayton, 45439, (513) 299-3060

Dayton Area Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

Greater Toledo Color Computer Club, William Paul Saba Sr., 3423 Cragmoor Ave., Toledo, 43614, (419) 385-9004

Tri-County Computer Users Group, William J. Loeffler, 2612 Dale Avenue, Rocky River, 44116, (216) 356-0779

Miami Valley CoCo Club, Tim Ellis, 1805 W. Parkway Dr., Piqua, 45356, (513) 773-2244

OKLAHOMA

Green Country Computer Association, Michael Keller, P.O. Box 2431, Tulsa, 74101, (918) 245-3456 (DATA)

PENNSYLVANIA

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

Skyline Color Computer Club of Berks County, Lewis F. Brubaker, 4874 Eighth Ave., Temple, 19560, (215) 921-3616

Pittsburgh Color Group, Ralph Marting, P.O. Box 351, West Mifflin, 15122, (412) 823-7607

RHODE ISLAND

New England COCONUTS, P.O. Box 28106, North Station, Providence, 02908

SOUTH CAROLINA

LoCo CoCo Club, Larry Coyle, 4334 Flynn Dr., Charleston, 29405, (803) 747-0802

Midlands 80 Computer Club, Frank Eargle, P.O. Box 7594, Columbia, 29202, TBBS (803) 791-7389

Spartanburg County CoCo Club, Lawrence Easler, Jr., Rt. 1 Highway 221, Spartanburg, 29302, (803) 578-3120

TENNESSEE

Tri-Cities Computer Club, Gary Collins, P.O. Box 4506 CRS, Johnson City, 37602-4506, (615) 929-1862

Foothills Micro-Computer Club, Aaron Sentell, P.O. Box 1541, Maryville, 37801, (615) 982-4629

TEXAS

The San Antonio Color Computer Club, James Leatherman, 2430 Rawhide Lane, San Antonio, 78227

UTAH

Salt City CoCo Club, Dennis Mott, 720 E. Browning Ave., Salt Lake City, 84105, (801) 487-6032, BBS (801) 487-6787

VIRGINIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Rd., Dale City, 22193, (703) 690-2453

Central Virginia Color Computer Club, Roger Lee, Rt. 2 Box 175, Madison Heights, 24572

WASHINGTON

Northwest Computer Club, Larry Haines, East 2924 Liberty, Spokane, 99207, (509) 483-5547

Mount Rainier Color Computer Club, Ron Amos, 2450 Lenore Drive N., Tacoma, 98406, (206) 752-8735

WEST VIRGINIA

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, 1306 Wells Circle, Parkersburg, 26101

WISCONSIN

Southern Wisconsin CoCo Club, David C. Buehn, 24607 67th Street, Salem, 53168, (414) 843-3830

CANADA

ALBERTA

Calgary Color Computer Club, Don Towson, 832 Cannell Rd. S.W., Calgary, T2W 1T4, (403) 281-2855

Edmonton CoCo Users Group, Dexter Dombro, P.O. Box 4507 Stn. South, Edmonton, T6E 4T7, (403) 439-5245

BRITISH COLUMBIA

Salmon Arm CoCo, David Coldwell, RR #4, Site 26 Comp. 13, Salmon Arm, V1E 4M4

MANITOBA

Winnipeg Micro-80 Users Group, Robert Black, 1755 King Edward St., Winnipeg, R2R 0M3, (204) 633-7196

NOVA SCOTIA

Halifax Dartmouth CoCo Users Group, Eugene Naugler, P.O. Box 572, Dartmouth, B2Y 3Y9

Colour Computer Halifax User Group (CoCo Hug), Paul A. Power, 6354 London St., Halifax, B3L 1X3, (902) 455-6341

ONTARIO

ESSA Color Computer Club, Albert L. Ley, 40 Perry Street, Barrie, L4N 2G3, (705) 728-9481

Kingston CoCo Club, Kenneth Bracey, 316 Westdale Ave., Apt. 4-C, Kingston, K7L 4S7, (613) 544-2806

K-W CoCo Club, P.O. Box 1291, Station C, Kitchener, N2G 4G8

London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706

Niagara Regional CoCo Club, Gerry Chamberland, 6843 Cumberland Crt., Niagara Falls, L2H 2J9, (416) 357-3462

Ottawa 6809 Users Group, Norm Shoihet, 1497 Meadowbrook Road, Ottawa, K1B 5J9, (613) 741-1763

Sarnia Computer Users Group, J. Verdon, P.O. Box 1082, Sarnia, N7T 7K5, (519) 344-6985

QUEBEC

Club d'Ordinateur Couleur du Quebec, Inc., Centre de Loisirs St-Mathieu, 7110- 8e Ave., St-Michel, Montreal, H2A 3C4, (514) 270-7507

Club ORCO-RS, Jacques Bedard, 33 Lisiere, St-Constant, P.Q., J0L 1X0, (514) 632-4311

Le Club Couleur du Nord, Gabriel Pigeon, C.P. 315, Barraute, P.Q., J0Y 1A0, (819) 734-2577

SASKATCHEWAN

Saskatoon Color Computer Club, L. Curtis Boyle, 35 Bence Crescent, Saskatoon, S7L 4H9, (306) 382-1459, BBS (306) 384-8040

FOREIGN

AUSTRALIA

Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Ri
stone, New South Wales, 2765, (02) 627-462

COCOPUG, Harry Murphy, 8 Lois Court, Rege
ville, New South Wales, 2750

CoCoHUG (Color Computer Hobart Users Grou
Robert Delbourgo, 15 Willowdene Aven
Sandy Bay, Hobart, Tasmania, 7005

ISRAEL

The First Color Computer Club of Israel, J. Yo
Krinsky, Data Processing Division, 1 Ra
Street, Netanya, Israel, (053) 52277

MEXICO

Mexcoco Users Group, Sergio Waisser, Paseo de
Soledad #120, Mexico City, D.F., 53920, pho
294-36-63

the NETHERLANDS

Color Computer Club Benelux, Jorgen te Giff
Eikenlaan 1, 4641 GB Ossendrecht, the Neth
lands

PERU

Piura Color Computer Club, Carlos Alvarez, B
142, AV. Guillermo Irazola, J-6 URB. Miraflor
Castilla, Piura, Peru, phone (074) 327182

WEST GERMANY

First CoCo Club Hamburg, Theis Klauberg, Krie
kamp 27A, Hamburg 65, West Germany 200
FRG, phone (040) 536-36-76

new clubs

Editor:

CoCo clubs desiring to exchange publi
domain software with the Color Americ
Users Group can contact Jack Eizenga, Dis
Librarian, 3811 N. Foster Avenue, 9170
Call (818) 960-8010. At the present time w
have 25 disks full of public domain softwar
We believe this to be one of the larges
collections anywhere.

Jack W. Eizeng
Baldwin Park, C

- I would like to announce the beginning o
the Fresno Color Computer Clu
(F.C.C.C.). For information, write to 607 E
Magill, 93710.

Mike Cyco
Fresno, C

- Is there anyone who lives in my area wh
would like to start a CoCo club? Write m
at 8250 Dorothy Street, 91770.

Tony Kwa
Rosemead, CA

- I would like to announce a new CoC
club called the South Bay Color Compute
Users Group. TBBS is running 11 variou
CoCo sub-boards with four separate up/
download software bases. Members wil
receive a monthly newsletter which contains a BBS list, pokes page, news section with the latest happenings from CompuServe, Delphi and other branches of the CoCo world. We will be holding monthly meetings where members can access our program library. For more information call (408) 867-2823, Allan Schaffer; (408) 923-2967, John Say; or call our TBBS at (408) 253-6293.

John Say
San Jose, CA

I would like to announce the existence of ie CoCo Cartel, a Color Computer users roup. For more information, write to 4059 cacia Drive, 31904.

Dennis Weldy
Columbus, GA

Does anybody out there want to start a ublic domain software club? The club ould include a directory of current public omain software that the club already has. his could be in the form of a newsletter. Its nembers could give and receive public omain software. The list could grow larger nd larger with every contribution. This ould really get the public domain software ut in the open. Send suggestions to 1821 Malibu Drive, 83401.

David Harris
Idaho Falls, ID

• Announcing the formation of the Willow-Works Club. If you're interested in joining, here is a $10 entry fee. For more information, write to 5753 S. Laflin, 60636.

Kevin L. Adair
Chicago, IL

• The Indy Color Computer Club meets the irst and third Tuesdays of each month, 7 .m., Cropsey Auditorium, Central Library, St. Clair at Pennsylvania, Indianapolis. Membership information may be obtained by calling Paul Chastain at (317) 545-2125, he I.C.C.C. Hotline BBS at (317) 873-5808 or by writing to I.C.C.C., P.O. Box 26521, Lawrence, IN 46226.

Kevin S. Jessup, Sr.
Lawrence, IN

• The Color Computer Club of Wichita meets on the last Thursday of the month at 7 p.m., District 70 I.A.M. Lodge, 235 ByPass and Meridian. Write me at 220 East Harry Street, 67220 or call (316) 685-9587.

William Wales
Wichita, KS

• The Red Stick CoCo Club is in operation. For information, write me at 3527 Hickorywood Avenue, 70807.

Justin Young
Baton Rouge, LA

• We would like to announce the existence of the Tandy Computer Club located in the Portland area. For more information, please call (207) 854-2862, or write P.O. Box 428, 04092.

Del Cargill
Westbrook, ME

• A *VIP* users group (for owners of *VIP* products), was recently formed. Interested persons can write me at Box 194, 01463. Hints, brief articles, letters, *VIP* database formats and CALC templates are gratefully received. There are no set dues, but contributions to defray the cost of copying and mailing the quarterly newsletter are most welcome.

John Ogasapian
Pepperell, MA

• Announcing the formation of a new CoCo club called the Williamsport Area Color Computer Club. Meets every third Wednesday of the month at 7 p.m. in the James V. Brown Library. If you have any questions contact me at (717) 322-9715 or send a message in the SIG on Delphi.

Christian Ross
(CGR)
Williamsport, PA

• The New England COCONUTS meets at the Warwick Public Library at 600 Sandy Lane, usually on the fourth Thursday of the month from 7 to 9 p.m. The address is Box 28106, North Station, 02908. We ask that all inquiries include an SASE for a response.

Robert J. Sullivan, Jr.
Providence, RI

• A few of my friends and I have decided to organize a CoCo club in Chattanooga. Write to me at 13809 Lillard Road, 37379 if you are interested.

Bill Kroulek
Soddy, TN

• I would like to announce the formation of the Virginia CoCo Club (VACC). We meet once a month in the Fairfax County Library. We have many benefits to offer such as a newsletter, a public domain software library and we are currently working on obtaining discounts from major manufacturers in the CoCo community. For more information, contact me by calling (703) 347-4022 or writing to Rt. 3, Box 203F, 22186. I can also be reached on the Handy Tandy BBS, which has a private section and features for club members only at (703) 573-7282.

Michael Saint
Warrenton, VA

• I am writing to let everyone know the new mailing address for the Vancouver Colour Computer Club is P.O. Box 76734, Postal Stn S, V5R 5S7.

Don MacDonald
Vancouver, British Columbia

• The 6809E Users Group was recently started with a goal of fellowship and the sharing of experience and knowledge in the use of the Color Computer. A big part of the club is the information and programs from RAINBOW magazine. For information, write to 136 Lansdowne Street, E3N 2M7.

Vance G. Anderson
Campbellton, New Brunswick

• I would like to announce to all CoCo users of Nova Scotia that the CoCo Co-Op is just starting out and wants to hear from you. We have games, hints, scores, clubs and reviews. A newsletter full of contests, ideas, hints to games, everything brought by the readers. Will exchange newsletters with other clubs. For more information, write to me at P.O. Box 427, B0S 1C0.

Michael Cress
Bridgetown, Nova Scotia

• The Sarnia Computer Users Group meets on the last Tuesday of the month at Alexander Mackenzie School. We have club disks and offer a newsletter. Anyone in the Sarnia area with a computer is invited to join. For more information, write me at 254½ Confederation Street, N7T 2A1.

Norm Lamoureux
Sarnia, Ontario

• The Durham 80C Computer Club meetings are held at Durham College in Oshawa, Room B 305, 7 p.m., first Wednesday of each month. We've been in operation for four years. Write to P.O. Box 95, Whitby, Ontario, L1N 5R7 for more information.

Durham 80C Computer Club
Whitby, Ontario

• The Club Micro-Ordinateur De Montreal-Nord has been in existence for six months. We teach BASIC language, assembly language and give many explanations on utilities programs. We meet every Saturday at Polyvalente Henri-Bourassa Local 101 from 1 to 4 p.m. For more information, write 12365 Boulevard Langelier #7, H1G 5X6 or call (514) 323-5958.

Gardy Neptune
Montreal-Nord, Quebec

• I am pleased to announce the promotion of the Advance Color Club of Rio De Janeiro. Our club library can boast the ownership of over 700 CoCo programs and we are growing daily due to new submissions. At present we have 102 members. We welcome correspondence from other existing CoCo groups. Anyone wishing to find out what owning a CoCo is all about can send a self-addressed stamped envelope to:

Pedro Napolitano Filho
Advance Color Club
Rau Humaita 104 Ap. 103 Botafogo
Rio De Janeiro, RJ CEP 22261, Brazil

• Announcing the existence of the Piura Color Computer Club in Peru. For information call (074) 327182 or write to me at:

Carlos Alvarez
Piura Color Computer Club
Av. Guillermo Irazola
J-6 URB. Miraflores Castilla
Box #142
Piura, Peru

• Anyone interested in joining the Puerto Rico CoCo Club can write me at:

Jose E. Colon
312 Tapia
Santuree, Puerto Rico 00912

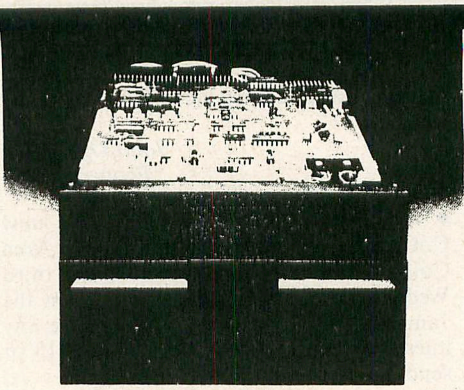
NEW DISK DRIVES

STARTING AT

$ 89.95

WITH CASE & POWER SUPPLY

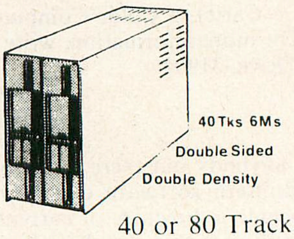
$129.95



TANDON MPI TEAC

Speed 6 ms tk to tk and up
Capacity 250k unformatted
Tracks 40
Warranty now 1 YEAR

New Low Price!



40 or 80 Tracks
1/2 Hght. Teac/Panasonic

CALL FOR SALE PRICES

We carry only the finest quality disk drives * no seconds * no surplus

SATISFACTION GUARANTEED!! ALL DRIVES FULLY TESTED & WARRANTEED

Complete Disk Drive with Power Supply & Case .... Teac $129.95

Two Drives in Dual Case & Power Supply .... Teac ..... ~~$279.95~~ CALL

1/2 ht double sided double density Disk Drives (Panasonic/Teac) **$ 119.95**

1/2 ht double sided double density Disk Drive with ps & case....... ~~$199.95~~ CALL

free How to use your new drive system on audio cassette

Single ps & case $44.95 Dual 1/2 ht ps & case .....$54.95 Dual ps & case... Call

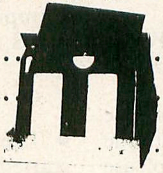
Color Computer Controller (J&M) $129.95

DRIVE 0 FOR RADIO SHACK COLOR COMPUTER
TANDON, MPI OR TEAC DRIVE (SINGLE SIDED 40 TRACKS SPEED 5 MS TRK TO TRK & UP)
POWER SUPPLY and CASE, TWO DRIVE CABLE WITH ALL GOLD CONNECTORS
J&M CONTROLLER, MANUAL and DOCUMENTATION .... ~~$249.95~~ ...... $ SALE!

BUY THE BEST FOR LESS! CALL!

DRIVE 0 FOR RADIO SHACK COLOR COMPUTER
PANASONIC 1/2 HEIGHT DOUBLE SIDED DOUBLE DENSITY DRIVE 500K unformatted
POWER SUPPLY and CASE, 2 DRIVE CABLE WITH ALL GOLD CONNECTORS
J&M CONTROLLER, MANUAL and DOCUMENTATION .... ~~$279.95~~ Super!! SALE!

TAKE ADDED SAVINGS ON TWO DRIVE SYSTEMS



DISKETTES with free library case $17.95

Unadvertised Specials .... $Call

Drives cleaned, aligned & tested $29.95

TECHNICAL STAFF ON DUTY, PLEASE CALL FOR ASSISTANCE.

CALL US TODAY!! 617-278-6555
ORDER TOLL FREE 1-800-635-0300

* DEALER INQUIRIES INVITED.
617-278-6555

TDP

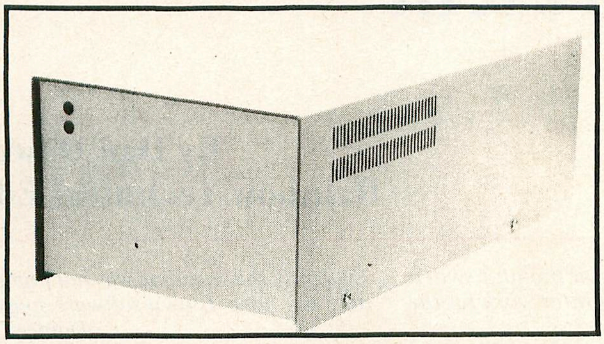
TRUE DATA PRODUCTS
9 SOUTH MAIN ST
UXBRIDGE, MASS. 01569
617-278-6555
HOURS MON-SAT 9-6 (EST)

We welcome
- Visa/Master Charge VISA MasterCard
- Checks (allow 2 weeks for clearing)
- C.O.D. Add $2.00

New Hard Drives

---------- COMPLETE SYSTEM ---------- JUST PLUG IN ----------

Call For
BEST PRICE



Warranty - One Full Year

5 to 20 Megabyte, ready to run on the TRS 80 Model I/III/IV/4P, color computer,

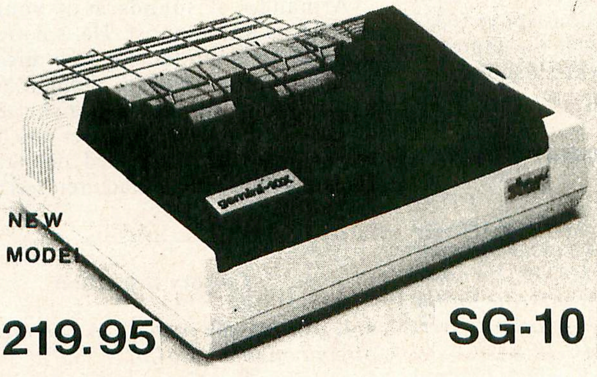
64K UPGRADES $19.95

VIDEO DRIVER **$24.95**
ENABLES YOUR COCO TO OPERATE WITH A VIDEO MONITOR INSTEAD OF A TELEVISION!

Panasonic 1091 Printer	239.95
1091 Printer & SP3 & Screen Dump	299.95

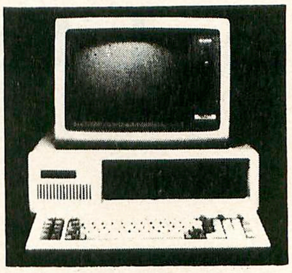
star PRINTERS

PRINTER CABLES AND INTERFACES AVAILABLE
Call for current pricing



$219.95 **SG-10**

IBM XT COMPATIBLE



call for low price

SCREEN DUMP PROGRAM

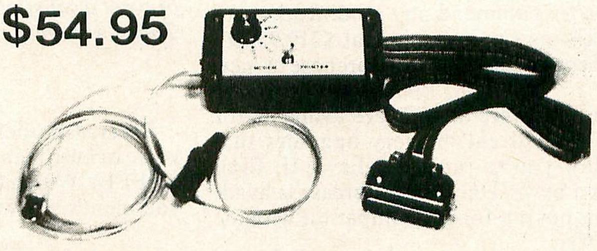
The best screen dump program for the Epson & Gemini printers ever!! Have the option of standard images reverse w/regular or double sized pictures 19^{95}

SP-3 INTERFACE for Color Computer

- 300-19,200 BAUD rates
- External to printer — No AC Plugs
- Built in modem/printer switch—no need for Y-cables or plugging/unplugging cables

Only:

$54.95



COMPLETE SYSTEM
299.95
NEW LOW PRICE
now with screen dump

Nothing more to buy!

Dealer inquiries invited

TRUE DATA PRODUCTS
9 SOUTH MAIN ST.
UXBRIDGE, MASS. 01569

CALL US TODAY!! 617-278-6555
ORDER TOLL FREE 1-800-635-0300

No Time Like the Present

By Dan Downard
Rainbow Technical Edito

• *I have a 64K 'E' Board CoCo and am planning to upgrade to 512K. Can I run OS-9 Level 2 on this upgraded system? Also, is it true that Motorola recently introduced a new VDG chip with the same pinouts as CoCo's present chip that performs all of the same functions but adds true lowercase and the rest of the ASCII character set?*

John Farrar
Lebanon, TN

John, you couldn't have picked a better time to be interested in OS-9 Level II and 512K. We have a cure for your concern for the new VDG chip, too.

As you probably noticed in last month's RAINBOW, the new CoCo 3 has been released. It features 128K expandable to 512K; enhanced Extended Color BASIC; OS-9 Level II (additional cost); a new combination VDG and SAM chip (called a GIME); upper- and lowercase 32, 40 or 80 column text; 640 X 192 four-color graphics; 320 X 192 sixteen-color graphics; composite, RF and analog RGB outputs; a new keyboard; plus it's compatible with most of the software and hardware you now own.

I don't recommend any modifications to your existing CoCo because at $219.95, it's more economical to just purchase a new CoCo.

I am not aware of software available for any of the current memory upgrades that will allow you to run OS-9 Level II. Even though a new VDG with lowercase is available, it is not pin-for-pin compatible with the old VDGs.

CoCo Compatible?

• *I have just acquired a Commodore 1902 Video Monitor. It has three switches: Composite, RGB and SEP. If I buy the Universal Video Driver and change the monitor switch to Composite, will this monitor work for the CoCo 2?*

David Lindberg
Cooperstown, NY

Dan Downard is an electrical engineer and has been involved in electronics for 27 years through Ham radio (K4KWT). His interest in computers began about eight years ago and he has built several 68XX systems.

Your Commodore 1902 will work fine with a CoCo 2, David. You will need a video driver for the CoCo; the one you mentioned should work fine. You are also correct in setting the switch to composite.

Ed Ellers informed me that the SEP position on the switch is for use with Commodore computers. They use a separate composite signal for the color information, so SEP stands for separate color signal.

No Dice

• *I have an old 16K Extended BASIC Color Computer. Decimal memory locations 16384 through 32767 (hexadecimal 4000 through 7FFF) are described as "not used." Is there any way I can use this wasted space for program and variable storage? I would like to know this because it sure would prevent a substantial amount of OM Errors. Thank you very much.*

Charles M. Murphy
New Hartford, NY

Sorry, Charlie! With only 16K of RAM you can't use memory locations above 16383 ($3FFF). With a 64K upgrade the addresses you mentioned will be at your disposal.

OS-9 Not Needed

• *I have a 64K CoCo with two drives and a Gemini 10X printer. A friend of mine purchased a second-hand MC-10. He asked me to type in the program you wrote for the October 1983 RAINBOW. This was to convert the CoCo's programs to MC-10 BASIC..*

This program is for OS-9, which I do not have. Is there any program I can get that will convert CoCo's programs to work on his MC-10?

When I type this MC10CONV *program I get SN Errors, since I do not have OS-9. Evidently this machine was not popular an does not have its own software source.*

Donice Chero
Pittsburgh, P

You don't need OS-9 to assemble th program you mentioned, Donice. It just s happened that we used the Microwar assembler in the Motorola compatible mod to generate the object code for this program It seemed like the thing to do since OS-9 ha just been released for the CoCo. I hope didn't confuse too many people.

If you don't want to fool around with a assembler, let me suggest buying a copy o RAINBOW ON TAPE.

Don't Sweat It

• *I have formatted the other side of single sided disks. My local computer store manager tells me that when I run my disks on the other side, they are internally rotating in the opposite direction than was intended and in doing so I am redispersing any dus captured by the felt cloth and possibly damaging my disk drives. Is this correct or is it safe to continue with the process?*

Armando Marin Arias
San Juan, PR

Armando, it sounds as if your local supplier is a true purist. He is correct; the disks do rotate in the opposite direction. I wouldn't worry about it, though. You can actually buy commercial diskettes that already have the write protect notches and timing holes for dual-sided operation, so evidently the disk manufacturers feel that it's OK.

Cursory Inspection

• *Is there a* `CHR$` *or* `POKE` *to turn the cursor off and on in my CoCo?*

I used to be able to do this on a TRS-80 Model II by using `PRINT CHR$(2)` *for off and* `PRINT CHR$(1)` *for on. Those same statements don't seem to work on my CoCo.*

Dorothy Witt
Indianapolis, IN

There are no routines to turn the cursor n or off in Extended BASIC, Dorothy. If you ave 64K, and first run a program such as *ROMRAM* to get to the 64K mode, you can isable the cursor with `POKE&HA199,&H39` or `POKE41369,57`). To restore the cursor, ype `POKE&HA199,&HA` (or `POKE41369,10`).

Printer Problems

• *I have a Gemini 10 printer (not the 10X). I have connected it to CoCo with a BOTEK Serial interface and do a lot of word processing using* Telewriter 64. *The system works fine except that if I try to print out a long ext the printer is excruciatingly slow. Instead of 100 characters per second, it prints at a rate of only two lines every 14 seconds or about 10 characters per second. This rate continues until the last 40 or so lines of text are reached after which the printer prints rapidly and continuously until the end of the text.*

The Gemini 10 has a built-in 2.3K buffer which may be causing this problem. I like all the good features of my system and do not want to buy a new printer. Is there any way I can fix this problem and get the true 100 character per second print rate from my printer?

Melvin A. Halpern
Charlotte, NC

The only thing I would suggest, Melvin, is that you set the BOTEK interface at 9600 Baud and `POKE150,1`. This fills up the buffer as fast as possible. It appears you can't print and fill the buffer at the same time. If this is the case, you may try disabling your buffer. If anyone has suggestions, please write.

Who's In Control?

• *Does it matter what operating system you have before you run OS-9? I would like to get* Cooking With CoCo *on an EPROM, so when the computer is turned on, it automatically runs the BASIC file called* AUTOEXEC.BAS *which in turn would boot OS-9 by running* *.BAS. *Is this possible or would that EPROM interfere with OS-9?*

Is it possible to put another Multipak on the system by plugging another one into the already existing one with a ribbon cable?

Anyone out there interested in a "real" remote keyboard with infrared transmitter and receiver, write me. My address is 10153 Parkview Dr. #8, 22110. Thank you.

Jerry Rossano
Manassas, VA

Jerry, when using OS-9 the ROMs, or EPROMs in your case, are disabled and you are in the 64K mode. When first turning on your computer some kind of operating system has to be there, or the microprocessor won't know what to do. You also need some type of boot program to tell the computer to jump to OS-9. A BASIC program that does this is included in the OS-9 package.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Your technical questions may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick DELPHI MAIL, then type SEND and address TO: DANDOWNARD. Be sure to include your complete name and address.

● COLOR BANKBOOK $19.95

● BUSINESS BANKBOOK
SYSTEM ONE
FOR ONE DISK DRIVE
$49.95
SYSTEM TWO
FOR TWO DISK DRIVES
$49.95

● SUPERDISK UTILITY
SEE REVIEW IN MAY '86 $ 9.95
RAINBOW PAGE 191

● RADIOLOG $ 9.95
SEE REVIEW IN MAY '86
RAINBOW PAGE 209

● CODE PRACTICE $ 9.95

ORDERS OR INFORMATION
CALL 1-800-628-2828
EXTENSION 552

ALL PROGRAMS INCLUDE MANUALS ,
REQUIRE 32K AND 1 DISK DRIVE.
ADD $2.00 SHIPPING & HANDLING
FLORIDA RES. ADD 5% SALES TAX

RAINBOW CERTIFICATION SEAL

SUNRISE SOFTWARE
8901 NW 26 ST DEPT R
SUNRISE, FL 33322

Formaker
clean paperwork for business

"It will give the small or home business professional-looking forms and effortless, errorless totals, accounting for taxes, discounts, shipping and deposits."
The RAINBOW, May 1986

menu driven
customize for your company
on screen instructions
creates: invoice, quote, purchase order,
mail order, receipt, letter
printer customization
and much, much more

RAINBOW CERTIFICATION SEAL

$49 32K ECB disc

"You have to look good to the customer . . . This program helps . . . by providing neat, well-prepared forms . . ."
The RAINBOW, May 1986

SUPER TUTOR

Makes learning so much FUN . . .
. . . that kids think it's a game!

RAINBOW CERTIFICATION SEAL

Letter and number recognition. Ages 2 to 6

$24 32K ECB disc or tape

"If you are looking for a program to teach young children the alphabet, numbers and early vocabulary, SUPER TUTOR may fit the bill."
The RAINBOW, June 1986

Send for more information:

Challenger Software
42 4th Street
Pennsburg, PA 18073
Call (215) 679-8792 (Evenings)

KISSABLE OS-9

Getting Revved Up For Fall Fun

By Dale L. Puckett
Rainbow Contributing Editor

Stand by for excitement! Sources confirm that the new Color Computer runs OS-9 Level II. Another OS-9 user who has seen the machine reported that its graphics capability is somewhere between the Atari ST-512 and the Commodore Amiga. Graphics programs running on both of these machines look super, so we are in for a real treat. I can hardly wait for all the details. While we're waiting, I'll give a review of OS-9 memory management schemes.

Much of the power of the new Color Computer will be made possible by Microware's OS-9 6809 Level II Operating System. On the surface, the casual user who only runs commercial programs probably won't notice much difference between OS-9 Level I and OS-9 Level II. Users who must deal with large data files in memory or programmers who want to run two or three tasks at a time through an OS-9 pipeline will notice a tremendous improvement.

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale works as a U.S. Coast Guard chief warrant officer and lives in Alexandria, Virginia.*

Most of the problems we have run into with OS-9 on the original Color Computer are caused by the limited amount of memory available in the 64K of memory addressed directly by the 6809 microprocessor. While it's true that OS-9 based computers exist that use only 4K of ROM and 2K of RAM, these small computers are really controllers. Essentially, they run the same small machine code program forever, monitoring external real world conditions in real time, opening and closing the valves and switches that keep a manufacturing process on track.

If you write all of your OS-9 programs in assembly language, you can get by with as little as 24K of workspace. Higher level languages like BASIC09 require at least 40K. Essentially, OS-9 Level I was designed for use on computers being used by one person. Most Level I machines contain 4K of ROM and 60K of RAM. The Color Computer uses 64K of RAM. It gets the information that is normally stored in ROM from Track 34 of an OS-9 boot disk. Level I machines can only address 64K of memory.

OS-9 Level II computers use memory management hardware that allows the 6809 microprocessor to address more than 64K of memory. Most of them use a chip called a DAT (Dynamic Address Translator). This chip moves memory in and out of the 64K address space used by the 6809. Most DAT chips switch 4K blocks of memory in and out of the 6809's workspace. In the past several years however, several large scale integration (LSI) chips have been released. These chips often switch the memory in and out of the 6809's 64K block in 2K increments.

The random access memory in your Color Computer can hold either data or programs. If you could peek into your computer's memory while it is running, you would see the names of a number of modules at the top of the 6809's 64K workspace. At the bottom of the workspace you would see a lot of temporary data being used by the programs stored in those modules. In the middle, you would find a bit of free memory to run additional programs.

When you load a new OS-9 program odule it is placed at the top of the vailable memory space. When you run hat program, it will use the first memry at the bottom of the available nemory space. The amount of memory equired by each program is stored in he program's module header.

If you have worked with computers or a while, you have probably come to ealize that you can never have too nuch memory. OS-9 designers knew his and threw in a lot of features to help nanage this important resource. OS-9 equires that all programs be reentrant. A program that is reentrant can be used y more than one person or process at he same time.

For example, two users may want to un a BASIC09 program at the same time. Many older operating systems would equire that two copies of BASIC09 be oaded into memory to make it possible. But, since BASIC09 is reentrant, both sers can use the same copy of it. In this xample, we have saved more than 22K f memory — a large chunk in a 64K omputer.

Despite OS-9's built-in memory saving features, we have all run into a problem called memory fragmentation. On an OS-9 Level I computer, fragmentation can be a serious problem. On Level II computers the problem goes away — almost.

Memory fragmentation becomes a problem when the available free memory is broken up into so many little pieces that OS-9 can't find enough memory in one contiguous block to load another program module or assign data memory to a running process. A process, by the way, is a program that is running.

An operating system that permits more than one program to run at the same time needs a way to divide the system's memory between programs. Earlier operating systems like CP/M, FLEX and PC-DOS didn't bother to manage their memory; they didn't allow more than one program to run at a time.

OS-9 Level I uses a first-fit allocation scheme to manage its memory. This means that when you attempt to load a program module or run a program, OS-9 assigns the first block of memory big enough to hold your module or meet the data requirement of your program. It assigns as much of this first free block of memory as the module needs and remembers that the rest of the block is available as a smaller block. The main disadvantage of this approach is it uses big blocks of memory and leaves a lot of small blocks that can only be used to hold small program modules or satisfy small memory requests.

If you want to watch OS-9's memory allocation in action on your Color Computer you can use the Mdir, Mfree and Sleep utilities to study the process. Start by experimenting with the example given on pages 302 to 306 of *The Complete Rainbow Guide to OS-9.*

The only way to de-fragment memory is to kill some of the processes running so they release the memory they are using. After killing them, you can restart them. When they are restarted, they will be assigned memory at both ends of the available memory space, leaving a larger chunk of memory free in the middle.

Memory fragmentation becomes a problem when the available free memory is broken up into so many little pieces that OS-9 can't find enough memory in one contiguous block to load another program module or assign data memory to a running process. A process, by the way, is a program that is running.

68020 - 68020 - 68020

15,204,352 BYTES = 14,848K BYTES = 14.5 MEGABYTES of RAM! - 30 USERS - EXPANDABLE - DMA - PROTECTION with OS9/68K - DYNACALC - STYLO - BASIC09 - FBU - QCOM! Nothing like it ANYWHERE! - INCREDIBLE! - The *QT20x*

FIND OUT MORE! - CONTACT US TODAY!

LIMITED TIME SPECIAL

Complete system with 20 Meg Drive only **$4495!**

2.5 Meg RAM, 6 Serial Ports 1 Parallel port, RTC.

1976 FHL FRANK HOGG LABORATORY 1986

770 James St., Syracuse, NY 13203 **Telex 646740**

315/474-7856

Fragmentation can take place in the data storage area at the bottom of available memory or in the module storage area at the top of memory. You will most often run into fragmentation in the data memory area when starting a lot of processes. This happens because each process has been assigned some space for data. If you terminate a medium-aged process first you will wind up with a small chunk of available memory in between the data memory used by the oldest and youngest running processes.

"Memory fragmentation is caused by changing memory demands."

As you will see when you experience the long-awaited new Color Computer, life is much easier with OS-9 Level II. And the most important advantage revolves around the way Level II systems manage their memory. Level II systems use Dynamic Address Translation hardware that gives the system a way to use lots of memory — even though the 6809 microprocessor can only address 64K.

OS-9 Level II lets each process run in its own 64K memory address space, isolated from all other processes that may be running on the system. This means that if you want to run a 4K sort program, you could request up to 60K of data memory for that process. In other words, the program module and the data area it uses must fit in a 64K space. The OS-9 system code which includes all device descriptors and drivers, file managers, etc., is running in its own 64K space independent of the workspace you are using. The end result for the average user is that OS-9 Level II will appear to be much easier to use.

A Gold Mine of Helpful Tips

We all seem to run into these same problems at one point or other in our OS-9 career. For example, Fred Swatelle of Huntsville, Texas recently sent us a number of interesting observations and some tips that are a real gold mine for beginners. We featured his sound-generating programs last April.

Swatelle wanted to save space on the system disk he uses with the OS-9 assembler so he used his editor to trim down the files in the Defs directory. Remember, if you try these tricks you should work only with a copy of the original system disk.

Before Swatelle edited the files on his disk, he listed the files to the printer so he would have a hard copy to work from. To do this he had to delete the OPT -L directives in the files. Additionally, he had to add the following lines at the beginning of the Rbfdefs and Scfdefs files.

```
ifp1
use /d0/defs/os9defs
endc
```

After you have followed the example, assemble the three files and redirect the listing to your printer.

```
OS9: asm/d0/defs/os9defs
 L >/p <CR>
```

Then, using the printed listing and a good editor, you can remove all comments from the code, as well as any unnecessary assembler directives. For example, Pag directives and blank lines may both be deleted. A text editor which displays the carriage returns is the best tool for the job because it makes it easy to delete strings of blank spaces. After you have finished, keep these bare bones files in your Defs directory and keep the hard copy listing as a reference manual. And if you have a few moments of spare time, use it to study the OS9Defs files. You will really be surprised at the information in these files.

Here's an example of one man's improvement being another man's obstacle. Swatelle tried out the new OS-9 Version 2.00.00 Dump utility and decided he didn't like it. The new version automatically configures the format of its output to the column width stored in the device descriptor being used. For example, if you type:

```
OS9: dump >/p <CR>
```

OS-9 checks the device descriptor, /p, and learns that your printer is 80 columns wide. It then formats its output accordingly. However, if you redirect the output of the Dump utility to a file, you will find it stored on your disk in the old 32-column format.

Swatelle wanted to be able to use the manual width control parameters available in the original Dump, so he deleted the new Dump and copied the old version from his Version 1.01 disk to his system disk.

If you own *DeskMate* but have no yet purchased your copy of OS-9 Version 2.00.00, you can use the module in the *DeskMate* system disk with th OS9Gen utility command from you original Version 1.01 system disks t make new system disks that use th Version 2.00.00 kernel. This will giv you some of the new features lik repeating keys, etc.

If you do have your copy of OS- Version 2.00, here's another tip fro Swatelle. He says that after he modifie the modules that came with Versio 2.00.00 to match his hardware, he saved them in place of the original copy in the Modules directory of his backup copy of the Config disk. For example, afte using Xmode and TunePort on the device descriptor for the printer device descriptor, /p, Swatelle deleted the copy on his working Config disk and saved the new version in a file named p.dd.

Again, remember you must only make these changes on a working copy of your Config disk. In fact, you should always make a working copy of all your OS-9 software immediately and store the original, unmodified disks in a safe place — just in case something happens to your working copy.

If you just moved to OS-9 and have not yet purchased an OS-9 disassembler, never fear. If you have been using Disk BASIC for a while and own Roger Schrag's *Super-Patched EDTASM*, you can use it to disassemble OS-9 code too. First, boot OS-9 and load the modules you want to disassemble. Then, run the Mdir e utility to find where they are stored in memory. Finally, without turning off your Color Computer, run *SPEDTASM*.

You will need to do some translation manually, since this Disk BASIC based disassembler won't recognize that an SWI2 interrupt is an OS-9 system call. You'll also need to look up the value of the byte following each SWI2 in the OS-9 technical information manual to find out which system call it is.

If you have swapped system disks or changed execution directories since you first booted OS-9 and you want to return to the original system disk booted from, just use the CLEAR/BREAK keys to terminate the current Shell. When you do this, SysGo starts a new Shell that uses the original execution and data directories.

Parallel Driver Patch for Disto

If you are using one of the earlier versions of the parallel driver for Tony

DiStefano's fantastic Disto PPrint hardware and have an older printer, you may be wondering about the Device Not Ready Error that keeps popping up. The delay loop that waits for the printer to signal it is ready to accept more characters did not allow enough time for some of the slower hardwares.

To solve the problem, run the OS-9 Debug utility and execute the following steps:

```
LParallel
.<SPACEBAR>.+4C
=20
Q
```

The original value at an offset of 4C Hex from the beginning of the Parallel module is 26, the Hex code for Branch If Not Equal (BNE). This patch changes it to a 20, the code for Branch Always (BRA). This causes the driver to skip the Device Not Ready trap. Be cautioned however, that it will cause your system to wait for the printer forever if it happens to be offline. After you make the patch above you can save the module Parallel into a temporary disk file and then verify if into a permanent file using the Verify utility's update CRC parameter.

```
OS9: save temp.Parallel
  Parallel
OS9: verify <temp.Para
  llel>Fixed.Parallel u
```

After making the patch and executing the two command lines you will be able to load the new drivers. You could also OS9Gen the Fixed.Parallel driver into your OS-9 boot file if you want to take the time.

And, from what I see, DiStefano is still at it — designing better hardware for our Color Computers. The latest idea is the queue, a keyboard adapter that will convert the standard CoCo keyboard into parallel ASCII. The device will be buffered and interrupt driven, and will support auto-repeat.

Multi-Tasking in Action

If you use a computer at work that lets you use desk accessories, you'll enjoy this tip from Pete Lyall. He runs *DynaStar* concurrently with the *XCom9* terminal program available from the OS-9 Users Group Software Library, or its author Greg Morse.

"Because of XCom's size — 5K for program, 2K for data — I am able to use *DynaStar* to edit a file while still online with *XCom9*. Try that with CoCo DOS!" Lyall said. "*XCom9* is a simple, no fancy stuff, freeware terminal. If accustomed to a terminal program that 'takes over' your system and gives you menu control, it may seem a little sparse at first. But once you get used to it, you will appreciate the fact that it is designed not to interfere with other programs running concurrently. It allows file capture and transmission as well as Xmodem file transfer."

Jonathan Cluts, a former Tandy employee, added that he had run Sled, a full-screen editor in memory with *XCom9*. "I have also downloaded a file, called up a new Shell, started that file printing and then gone on to download another file," Cluts said.

Congratulations

Congratulations are in order for Wayne Day, president of Golden Triangle Corporation and fellow RAINBOW author. Day recently formed the Tandy Users Network (TandyNet) to serve the full line of Tandy microcomputers. He has operated The Color SIG on CompuServe since its beginning in 1982. The new network takes the place of four existing Tandy SIGs that had been operated by individual managers scattered across the nation. TandyNet will allow the individual SIGs to share information, improving the support for Tandy computer users.

"Over the years, the forums have become a gigantic users group that holds meetings 24 hours a day," he said. "We have taken the idea one step further and created a blanket group — the Tandy Users Network."

A Tip of the Hat to Tim Harris

Tim Harris, who has contributed several programs to this column and *The Complete Rainbow Guide to OS-9*, was published in the May issue of *Dr. Dobb's Journal*. Harris took an earlier article in that publication to task.

"One of the most novel features added in Version 2 of MS-DOS is the concept of 'installable device drivers,'" the article said. Color Computer owners have been using this "new concept" for at least three or four years! But, let's quote Harris:

"I would like to say that this concept may be new and novel for Microsoft and MS-DOS but it is certainly not a new and novel concept for other operating systems. The initial 6809 OS-9 Level I released in 1978 sported this feature," Harris told *Dr. Dobb's Journal* readers. Good job Tim. That's the kind of evangelism we need. If we tell them often enough, they are bound to stop and pay attention.

Speaking of Evangelism

You can become an OS-9 evangelist by writing letters like the one Tim

OS-9™ SOFTWARE/HARDWARE

SDISK—Standard disk driver module allows the full use of 35, 40 or 80 track double sided disk drives with COCO OS-9 plus you can read/write/format the OS-9 formats used by other OS-9 systems. (Note: you can read 35 or 40 track disks on an 80 track drive). Now updated for OS-9 ver. 02.00.00 **$29.95**

SDISK + BOOTFIX—As above plus boot directly from a double sided diskette **$35.95**

L1 UTILITY PAK—Contains all programs from Filter Kits Nos. 1 & 2 plus Hacker's Kit #, plus several additional programs, Over 35 utilities including "wild card" file cmds, MacGen command language, disassembler, disk sector edit and others. Very useful, many of these you will find yourself using every time you run your system. These sold separately for over $85. **$49.95**

SKIO—Hi res screen driver for 24 x 51 display; does key click, boldface, italics; supports upgraded keyboards and mouse. With graphics screen dump and other useful programs. **Now UPDATED FOR OS-9 Ver 2.0 $29.95**

PC-XFER UTILITIES— Utilities to read/write and format ss MS-DOS™ diskettes on CoCo under OS-9. **$45.00 (requires SDISK)**

CCRD 512K Byte RAM DISK CARTRIDGE—Requires RS Multipak interface, two units may be used together for 1MB RAM disk. OS-9 driver and test software included. **$199.00**

All disk prices are for CoCo OS-9 format; for other formats, specify and add $2.00 each. Order prepaid or COD, VISA/MC accepted, add $1.50 S&H for software, $5.00 for CCRD; actual charges added for COD.

D.P. Johnson, 7655 S.W. Cedarcrest St.
Portland, OR 97223 (503) 244-8152

(For best service call between 9-11 AM Pacific Time)

OS-9 is a trademark of Microware and Motorola Inc.
MS-DOS is a trademark of Microsoft, Inc.

Listing 1: *gotoxy*

```
  nam gotoxy.adm3

  ttl DynaStar editor XY routine for Disto 80 Column Card

 *
 *  Allan G. Jost  January 10, 1982
 *
  use /H0/DEFS/Defsfile

  ttl DynaStar XY routine for CoCo
  opt g
  org 0

EndMem equ .  no data space for a subroutine
Vers equ 2  version number
  mod EndMod,Name,Sbrtn+Objct,Reent+Vers,Entry,EndMem
Name fcs "gotoxy"
  fcb Vers
Entry bra Go
  fcb 24  number of lines on terminal
  fcb 80  number of characters per line
  fcb 1   This terminal scrolls
  fcb 1   length of Clear Line Sequence
  fcb 4   byte that clears line
  fcb 0   no initialization sequence

*  on entry X contains X-coordinate: 1 .. 80
*           B contains Y-coordinate: 1 .. 24

Go equ *  actual entry point
  leas -3,S  make working space
  addb #31 change Y to cursor control char
  stb 2,S  and put into work space
  tfr X,D  get the X coordinate
  addb #31 and change it also
  stb 1,S
  ldb #2  xy-cursorcode
  stb 0,S  finish building work space
  lda #1  standard output path
  leax 0,S  the escape sequence
  ldy #3  and its length
  os9 i$write put it out to console
  leas 3,S  restore stack by releasing work space
  rts  back to caller now, folks
  emod
EndMod equ *  this is the end, folks.
```

Listing 2: *HGraph.c*

```
  /*

   HGRAPH - Horizontal Bar Graph Program
               by Milt Webb

  This program demonstrates the use of structures
  and sequential disk files containing mixed types.
  Create a bar graph with up to 16 bars by entering
  the title, subtitle, scale (range) of the graph
  and the label and value of each bar. The program
  is menu driven and the graph files are read/saved
  in the current data directory. This program is written
  for 80 column displays. The #defines may be altered
  accordingly for hi-res displays.

  */

   #include <stdio.h>
  #include <ctype.h>
  #define TRUE 1
  #define FALSE 0
  #define TERMWID 80  /* width of terminal screen */
  #define MAXITEMS 16 /* size array of items to graph */
  #define TITLEN 41   /* length of title, subtitle string +1 */
  #define LBLEN 19    /* length of label strings +1 */
  #define NAMLEN 12   /* length of filename */
  #define STOP ""     /* empty string */
  #define CLEARS 2    /* clear screen, home cursor for wordpak */

  char h1[] = "HORIZONTAL BAR GRAPH v1.1";
  char h2[] = "by Milt Webb";
  long i, count, j, points;
  long GWIDTH = (TERMWID - LBLEN - 1);

  struct param {
      char title[TITLEN];
      char subtitle[TITLEN];
      long upper;
      long lower;
      long count;
      } header;

  struct data {
      char label[LBLEN];
      long value;
      } bar[MAXITEMS];
```

Harris sent to *Dr. Dobb's Journal.* But even if you are writing letters like this and telling all your friends about OS-9, please don't forget to cover another very important audience — those people already using OS-9.

Are we covering this base? I don't think so because we don't have everything we need. If OS-9 is to succeed in the consumer marketplace it must have a reason for being. There must be hundreds of application programs to do the jobs that people buy computers to do.

To make this happen we must encourage the programmers already within our ranks. We must salute them when they move the state of the art forward. We must encourage them to make bold steps forward with innovative techniques, rather than discourage them with our criticism.

I say these things after reading the mail on both CompuServe's OS-9 SIG and on RAINBOW's Delphi CoCo SIG. There are a lot of helpful people using both of these electronic bulletin boards, but there is also too much criticism. This criticism, especially when combined with low sales and minimal profit, discourages programmers from writing new programs. As a result, we all suffer.

For example, people criticize Tandy for making a business decision when they designed their OS-9 implementation. Then, they criticize Microware for delivering the product the customer ordered. They don't stop to realize one important basic of the business world — the customer is always right.

Frankly, Tandy had a good reason for every feature they put in Color Computer OS-9. We may or may not agree with the selection made by Tandy's designers, but we must realize that these business decisions were not made lightly. And to be quite honest, we must also realize that if Microware hadn't been willing to deliver the product Tandy wanted, Tandy probably would have picked another operating system for the Color Computer. Then where would we be?

Everyone deserves a pat on the back once in awhile — especially when he is not getting rich in a market he is supporting out of pure love. If this positive attitude theory seems like a lot of hogwash to you, I challenge you to look around the business world. I think you'll find that companies that project a positive, can-do attitude to the public and to their own employees are the ones getting ahead. Organizations run by managers who try to think of reasons not to do something are falling like flies.

The bottom line: If you know a better way to do something, do it. If it's something everyone can use, sell it. If it's not, share it. But, do it. And, please don't put the other guy down just because his approach is a little different.

Sell Your Program in Japan

Ark Corporation is interested in good applications to market in Japan. They report that the Fujitsu FM-11, an OS-9 Level II machine, is the most popular in Japan. The company is also introducing three types of plug-in OS-9 68K boards for the leading personal computers in Japan.

"The biggest and most well-known disadvantage of OS-9 when compared to other systems is its lack of application programs," says Ark's Vice-President Hirokazu Sugawara. "Thus, we are looking for good OS-9 programs to introduce in Japan while developing our own. We need good programs for business, communications, database management, entertainment, home accounting, programming and word processing."

If they like your program, Ark will grant you an exclusive distribution license in the Japanese market, prepare a Japanese operating manual and make any modifications needed to make it fit the Japanese market. They pay 10 to 20 percent of the program's retail value in royalties. Their FAX number is 03-350-8383. Their phone number is 03-350-5171. If you have a good program, go for it!

Bob Rosen called my attention to the fact that OS-9 has made *Byte* magazine again — this time in a brief report from Comdex. *Byte* reported that Microtrends of Schaumburg, Ill., has introduced versions of OS-9 for the Amiga, Atari ST and Macintosh. The report also mentioned compact disk interactive and noted that OS-9 "is similar to UNIX but smaller and less complex."

An Assembly Language Tip

John Bowden, a Navy cryptologic technician stationed in Adak, Alaska, wrote us recently and asked how to run another OS-9 command from within an assembly language program.

"My quest started with the simple desire to clear my text screen in OS-9 without typing the cumbersome Display C," Bowden said. "At first I used a simple procedure file that ran the command line Display C when I typed `CLS`. That was fine but it took a lot of

```
 main()
{

  int k,r;
  pflinit();  /* need this to print long integers */
  while(1)    /* make menu repeat until Q is hit */

     {
     putchar(CLEARS);  /* clear display and home cursor */
     printf("\n\n");
     center(h1);
     center(h2);
     printf("\n");
     printborder();
     printf("\n\n\n");
     center("Type 'L' to LOAD graph file.");
     printf("\n");
     center("Type 'C' to CREATE a new graph.");
     printf("\n");
     center("Type 'Q' to QUIT program.");
     printf("\n\n\n");
     printborder();
     printf("Selection: ");
     k=toupper(getchar());
     switch(k)
          {
          case 'L':
               if ( r = (readgraf() == TRUE) )   dograf();
               printf("Press ENTER to return to menu.");
               k=getchar();
               break;

          case 'C':
               askinfo();
               askitems();
               dograf();
               if ( r = (savgraf() == TRUE) )
                     {
                     printf("Press ENTER to return to menu.");
                     k=getchar();
                     }
               break;

          case 'Q':
               exit(0);
               break;

          default:
               break;
          } /* end switch */
     } /* end while */
} /* end main */


 askinfo()
/* get title,subtitle & range of graph */
  {
  while (getchar() != '\n');  /* purge input buffer */
  printf("Title for graph: ");
  gets(header.title);
  printf("Subtitle: ");
  gets(header.subtitle);
  printf("Enter the upper range for this graph: ");
    scanf("%ld", &header.upper);
  printf("Enter the lower range for this graph: ");
    scanf("%ld", &header.lower);
    while (getchar() != '\n');  /* purge input buffer */
  }


 askitems()
/* Get labels and data values for graph */
{
putchar(CLEARS);
printf("Enter up to %d items for this graph.\n", MAXITEMS);
printf("Maximum label length is %d characters.\n",LBLEN-1);
printf("Press <ENTER> at a label prompt when finished.\n");
printborder();
printf("\n");

header.count = 0;
/* get things started */
printf("Enter label for item %ld: ", header.count+1);

while ( header.count < MAXITEMS
   && strcmp(gets(bar[header.count].label),STOP) != 0 )
   {
   printf("Now, the data for > %s: ", bar[header.count].label );
   scanf("%ld", &bar[header.count++].value);
   printf("\n");
   while (getchar() != '\n');  /* purge input buffer */
   printf("Enter label for item %ld: ", header.count+1);
   }
 }
```

Protect and highlight your important magazine collection with sturdy RAINBOW binders

RAINBOW
RAINBOW
CoCo Power!

Distinctive, Durable RAINBOW Binders

THE RAINBOW is a vital resource to be referred t again and again. Keep your copies of THE RAINBOW saf in our quality, distinctive binders that provide com plete protection.

These **attractive red vinyl binders** showcase you collection and ensure your RAINBOWS are in min condition for future use. Each binder is **richly em bossed with the magazine's name in gold** on the fron and spine. They make a handsome addition to any room.

Put an End to Clutter

Organize your workspace with these tasteful binders. Spend more time with your CoCo and eliminate those frustrating searches for misplaced magazines.

A set of two binders, which holds a full 12 issues of THE RAINBOW, is only $13.50 (plus $2.50 shipping and handling).

Special Discounts on Past Issues

To help you complete your collection of THE RAINBOW, we're offering a **special discount on past issues** of the magazine.

When you place an order for six or more back issues of THE RAINBOW at the same time you order binders, you are entitled to $1 off the regular back issue price. To order, please see the "Back Issue Information" page in this issue.

Know Where to Look

You may purchase the "Official And Compleat Index To THE RAINBOW" for $1 when you purchase a set of binders. This comprehensive index of RAINBOW's first three years (July 1981 through July 1984) is usually priced at $2.50.

For greater convenience, order RAINBOW Binders through the shopping area of the CoCo SIG of Delphi!

______ **YES**. Please send me ________ set(s) of RAINBOW binders

Take advantage of these special offers with your binder purchase:

______ Save $1 off the single issue cover price for back issues. Minimum order of 6 magazines. Please enclose a back issue order form from a recent issue indicating magazines wanted.

______ Purchase the "Official and Compleat Index to THE RAINBOW" for $1. (Regular price $2.50.)

(These offers good only with the purchase of a RAINBOW binder set)

Name ____
Address ____
City ______________________ State __________ ZIP __________
☐ My check in the amount of ________ is enclosed. (In order to hold down costs, we do not bill.)
Charge to: ☐ VISA ☐ MasterCard ☐ American Express
Account Number ____________________ Expiration Date __________
Signature ____

Mail to: **Rainbow Binders, The Falsoft Building, P.O. Box 385, Prospect, KY 40059.**

Binders are $13.50 per two-binder set plus $2.50 shipping and handling. If your order is to be sent via U.S. mail to a post office box or foreign country, please add $2. Kentucky residents add 5% sales tax. U.S. currency only, please. In order to hold down non-editorial costs, we do not bill.

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST

All other inquiries call (502) 228-4492.

me because of the extensive disk I/O.
Vhat I really would like to do is imple-
nent the Display C command in assem-
ly language.”

There are two ways to clear the Color
Computer screen from within an OS-9
ssembly language program. A short
ssembly language program that sends
he clear screen character, 12 decimal or
0C Hex, to the standard output would
e the most direct route. We'll show you
he code to do that first, and then list
short segment of code to run your
rogram from within another program.
Ve'll finish with a piece of code to let
ou execute the display command with
he character 12 decimal as a parameter.

```
* This program will clear the screen on
  your Color Computer
* Syntax: cls <ENTER>

nam cls
* Use standard OS-9 Defsfiles

ifpl
use /D0/DEFS/defsfile
endc

opt L
ttl Clear Screen Utility

* Use standard OS-9 module header

mod clssiz,clsnam,type,revs,start,size
clsnamfcs /cls/
typeset PRGRM+OBJCT
revsset REENT+1

*. Data Memory Area Defined here

clrchrrmb 1

* Reserve room for stack
rmb 250
sizeequ .

* Actual code starts here

startlda #$0Cclear screen character
sta clrchr   store it in data area
leax clrchr,upoint to character
ldy #1we want to send one character
lda #1to the standard output path
os9 i$writego send it
clrbclear carry
os9 f$exitand exit
emodmark the end of the module
clssizequ *
end
```

This short assembly lanaguage program sends the character 12 decimal to OS-9's standard output path. On a Color Computer this character clears the screen. In fact, most printers use the same character for a form feed, so you can redirect the output of the new command to start a new page on the printer.

```
OS9: cls>/p
```

To run your Cls program from within another assembly language program you can insert the following code in your other program.

```
* Execute cls utility command
* First define the strings

shlstrfcs /shell/
cmdstrfcc /cls/
```

```
dograf()
  /* display the graph */
  {
  putchar(CLEARS);
  center(header.title);
  center(header.subtitle);
  printf("\n\n");
  printf("%20ld%60ld",header.lower,header.upper);
  printborder();
  for ( i=0 ; i<header.count ; i++)
    {
    printf("%-18s|", bar[i].label);
    points = ((bar[i].value -header.lower) * GWIDTH)
             / (header.upper -header.lower);

    if ( bar[i].value < header.lower )
      putchar('<');
        else if ( points < 1 )
          points = 1;       /* need at least one point */
    else if ( points > GWIDTH )
      points = GWIDTH;

    for ( j=0 ; j<points ; j++ )
      putchar('*');

    if (bar[i].value > header.upper)
      putchar('>');
    else printf("\n");
    }
  printborder();
  }

readgraf()
/* read data from graph file - current data directory */
   {
   int c;
   int errflg=TRUE;

   FILE *filptr;
   char filename[NAMLEN];

   while (getchar() != '\n');  /* purge buffer */
   printf("Enter filename for graph to view: ");
   gets(filename);

   if ( (filptr=fopen(filename,"r")) == NULL )
      {
      printf("Sorry, cannot open %s.\n", filename);
      errflg=FALSE;
      }
   else
      {
      fread(&header,sizeof(header),1,filptr);
      fread(&bar[0],sizeof(bar),1,filptr);
      fclose(filptr);
      } /* end else */

   return errflg;
   } /* end func */


  savgraf()
 /* save graph data in current data directory */
    {
    int c;
    int errflg=TRUE;
    FILE *filptr;
    char filename[NAMLEN];

    printf("Enter filename for this graph: ");
    gets(filename);

    if ( (filptr=fopen(filename,"w") ) == NULL)
         {
         printf("Sorry, cannot open %s.\n",filename);
         errflg=FALSE;
         }

    else
       {
       fwrite(&header,sizeof(header),1,filptr);
       fwrite(&bar[0],sizeof(bar),1,filptr);
       fclose(filptr);
       } /* end else */

    return errflg;
    } /* end func */

 center(string)
 char *string;
 /* print argument centered on display */
    {
    int spaces, num;
spaces = (TERMWID - strlen(string)) / 2;
for (num = 1 ; num <= spaces ; num++)
        putchar(' ');
printf("%s\n",string);

    }


printborder()
/* print a border row of '=' signs */

   {
   int num;
   for ( num=0 ; num<TERMWID ; num++ )
     putchar('=');
   }
```

Listing 3: *cls*

```
PROCEDURE cls
DIM hp:BYTE
DIM name:STRING[3]
name:="/hi"
OPEN #hp,name:WRITE
PRINT #hp,CHR$(12);
CLOSE #hp
END
```

Listing 4: *printat*

```
PROCEDURE printat
PARAM col,row:INTEGER
DIM hp:BYTE
DIM name:STRING[3]
name:="/hi"
OPEN #hp,name:WRITE
PRINT #hp,CHR$(2); CHR$(col+32); CHR$(row+32);
CLOSE #hp
END
```

Listing 5: *toggle*

```
PROCEDURE toggle
DIM name:STRING[3]
DIM hp:BYTE
name:="/hi"
OPEN #hp,name:WRITE
PRINT #hp,CHR$(20)
CLOSE #hp
END
```

Listing 6: *box*

```
PROCEDURE box
(* Calling syntax is : *)
(* RUN BOX (hstart,vstart,hend,vend)  *)
PARAM hstart,vstart,hend,vend:INTEGER
RUN gfx("line",hstart,vstart,hend,vstart)
RUN gfx("line",hstart,vstart,hstart,vend)
RUN gfx("line",hend,vstart,hend,vend)
RUN gfx("line",hend,vend,hstart,vend)
END
```

Listing 7: *fillbox*

```
PROCEDURE fillbox
PARAM hstart,vstart,hend,vend:INTEGER
DIM linecount,counter:INTEGER
linecount:=vend-vstart
FOR counter:=0 TO linecount-1
RUN gfx("line",hstart,vstart+counter,hend,vstart+counter)
NEXT counter
END
```

Listing 8: *pixsaver*

```
PROCEDURE pixsaver
DIM vdisplay,number:INTEGER
DIM title:STRING[10]
```

```
fcb 13<RETURN> character

leax shlstr,pcrpoint to "shell"
ldy #4size of parameter string
leau cmdstr,pcrpoint U-register to "cls"
lda #1it's 6809 object code
clrboptional data area size
os9 f$forkgo start the cls as a process
bcs error
os9 f$waitand wait for it to finish

* resume other program execution
```

You could modify this code to run the OS-9 Display utility command like this

```
* Execute display utility command
* With "C" as a parameter
* Define the strings

shlstrfcs /shell/
cmdstrfcc /display c/
fcb 13<RETURN> character

leax shlstr,pcrpoint to "shell"
ldy #10size of parameter string
leau cmdstr,pcrpoint U-register to "cls"
lda #1it's 6809 object code
clrboptional data area size
os9 f$forkgo start the cls as a process
bcs error
os9 f$waitand wait for it to finish

* resume other program execution
```

Study the differences between the two code segments and you'll quickly pick up the idea. If you put code like this in your assembly language programs, it is up to you to insure that the programs running from within those programs are actually loaded in memory or available in the current execution directory. Have fun!

RS-232 Tip

For something that is supposed to be simple, serial communication between two computers is often quite confusing. We get a lot of letters from people trying to use their Color Computers with other computers. In fact, I had trouble when I tried to fire up my RS-232 Pak the first time.

I could get my terminal programs to run perfectly when I plugged the RS-232 Pak into a modem. But every time I tried to communicate with another computer I was stopped at the pass. I could send, but I couldn't receive — even though I had made the connection through a null modem cable.

The problem revolves around the fact that the RS-232 Pak wants to see a carrier signal from the modem before it works properly. My solution was to short Pin 20, the data terminal ready signal from the RS-232 Pak to Pin 8, the carrier detect line. I made this connection on the end of the cable that plugged into the RS-232 Pak. By cheating like this I was essentially telling the RS-232 Pak that there was always a carrier.

Other people cheat their connections to the RS-232 Pak in a similar manner. For example, one programmer I know always creates a false carrier by jumper-ng pins 6, 8 and 20 on both ends of his able.

To make your second computer look ike a modem you also need to connect 'in 2 on one end of your cable to Pin on the other and vice versa. Additionlly you must short Pin 4 to Pin 5 on oth ends of the cable and make sure hat Pin 7 is passed through from one nd of the cable to the other. The only lisadvantage to shorting these control ins is your terminal will not be able to end a hardwired signal to your Color Computer to tell it to stop sending if it appens to get behind.

This Month's Listings

We've received several notes from eople who have upgraded their hardware and don't have the proper GoToXY routine to work with *DynaStar* and *DynaSpell*. Our first listing this month will let you use your Disto 80-column ard with these programs. You can modify the listing to work with the standard Color Computer screen in Version 2.00.00 by simply changing the size definitions.

Our next listing is a C program named *HGraph.c* from Milt Webb. *HGraph.c* creates horizontal bar graphs on an 80-column screen, demonstrates how to use a menu within a C program and shows you how to save and read sequential files containing mixed data types. It is Webb's first program.

Our final listings were contributed by Robert B. Stephens. He uses BASIC09 with the Xscreen package from Microtech Consultants, Inc. He displays all his text on the Xscreen device, /hi. If you are using a different screen, you can use similar code by just changing the name of the device. I tried both *Cls* and *Printat* with the standard Tandy 32-column display and they worked just fine.

"I wrote a short procedure called *Pixsaver* to save graphics screens," Stephens said. "Picture files are stored in a directory named PIX. To view the pictures you use a procedure named *Pixshow*. Another procedure named *Toggle* lets you inverse letters with Xscreen. The latter may be used to highlight single words or inverse the entire display."

That's it for October. Hopefully, by the time I sit down to write the November column we will have at least seen the new OS-9 Level II Color Computer. In any case we'll be attempting to round up more tips for all OS-9 users. ☐

```
DIM pixpath,pixbyte,hp:BYTE
DIM name:STRING[3]
name:="/hi"
OPEN #hp,name:WRITE
RUN printat(0,0)
INPUT "Picture title?",title
CREATE #pixpath,"/D0/pix/"+title:WRITE
RUN gfx("Gloc",vdisplay)
RUN printat(0,0)
PRINT #hp,"                              "
 FOR number:=0 TO 6143
 pixbyte:=PEEK(vdisplay+number)
 PUT #pixpah,pixbite
 NEXT number
 CLOSE #pixpah
 CLOSE #hp
 END
```

Listing 9: *pixshow*

```
PROCEDURE pixshow
(* If you are not using a hi-res display, you *)
(* must add gfx("mode") statement to this procedure. *)
DIM pixbite,hp:BYTE
DIM px:BYTE
DIM name:STRING[3]
DIM vdisplay,number:INTEGER
name:="/hi"
OPEN #hp,name:WRITE
PRINT #hp,CHR$(12)
RUN printat(0,0)
PRINT #hp USING "s64^","PixShow : See Pix directory for file names."
PRINT #hp USING "s64^","Filename";
RUN gfx("Gloc",vdisplay)
RUN printat(28,13)
INPUT file$
OPEN #px,"/d0/pix/"+file$:READ
SEEK #px,0
FOR number:=0 TO 6143
GET #px,pixbite
POKE vdisplay+number,pixbite
NEXT number
CLOSE #hp
CLOSE #px
END
```

Listing 10: *calc*

```
PROCEDURE calc
DIM a,b,c,d,e,f,g,h,i,j,k,l,m,n:REAL
DIM o,p,q,r,s,t,u,v,w,x,y,z:REAL
DIM pp:BYTE
DIM sp:BYTE
DIM name:STRING[2]
name:="/p"
PRINT CHR$(12)
PRINT "C A L C U L A T O R ... All Basic Math Functions work!"
PRINT "Variables are letters a-z -- assign with let a=xxx"
PRINT "The printer path is #pp -- Send text or variables there at will."
PRINT "If you want anything hardcopy -- don't forget to turn on your printer."
INPUT " ... Printer on? (y/n) ",yesno$
IF yesno$="y" THEN OPEN #pp,name:WRITE
ELSE PRINT
ENDIF
INPUT "Do you want to save some of this stuff? (y/n) ",query$
IF query$="y" THEN
PRINT "File name is ScratchPad: Send data there at will."
PRINT "Syntax is PRINT #sp, <text>, <mathfunction(variable)>"
OPEN #sp,"ScrtchPad":UPDATE
ELSE PRINT
ENDIF
PRINT "Type <cont> <ENTER> to close paths."
PAUSE
IF yesno$="y" THEN
PRINT "Printner path closed."
CLOSE #pp
ENDIF
IF query$="y" THEN
PRINT "Scratch Pad closed."
CLOSE #sp
ENDIF
END
```

Listing 11: *make_scratchpad*

```
PROCEDURE Make_ScratchPad
DIM Scratch_Pad:BYTE
CREATE #Scratch_Pad,"ScratchPad":UPDATE
PRINT "The ScratchPad file for Calculator has been created."
CLOSE #Scratch_Pad
END
```

THESE FINE STORES CARRY THE RAINBOW

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA	
Birmingham	Jefferson News Co.
Brewton	McDowell Electronics
Florence	Anderson News Co.
Greenville	M & B Electronics
Madison	Madison Books
Montgomery	Trade 'N' Books
ALASKA	
Fairbanks	Electronic World
ARIZONA	
Phoenix	TRI-TEK Computers
Sierra Vista	Livingston's Books
Tempe	Books Etc.
	Computer Library
Tucson	Anderson News Co.
ARKANSAS	
Fayetteville	Vaughn Electronics/Radio Shack
Little Rock	Anderson News Co.
CALIFORNIA	
Citrus Heights	Software Plus
Grass Valley	Advance Radio, Inc.
Half Moon Bay	Strawflower Electronics
Hollywood	Levity Distributors
	World Book & News Co.
Lompoc	L&H Electronics Emporium
Los Angeles	E.D.C. Industries
	Polygon Co.
Sacramento	Tower Magazine
Santa Rosa	Sawyer's News, Inc.
Sunnyvale	Computer Literacy
COLORADO	
Westminster	Software City
DELAWARE	
Middletown	Delmar Co.
Milford	Milford News Stand
Wilmington	Normar, Inc.—The Smoke Shop
FLORIDA	
Boca Raton	Software, Software, Inc.
Cocoa	The Open Door
Davie	Software Plus More
Ft. Lauderdale	Electronics Engineers
	Mike's Electronics Distributor
Jacksonville	The Book Nook
	Book Town
	Deano's TV
Melbourne	City Newsstand
	The Little Store
North Miami Beach	Almar Bookstore
Orlando	Book Mania
Panama City	Boyd-Ebert Corp.
Pensacola	Anderson News Co.
Pinellas Park	Wolf's Newsstand
Sarasota	Family Computers
Sunrise	Sunny's at Sunset, Inc.
Tallahassee	Anderson News Co.
Tampa	Fine Print Bookstore
	Sound Trader & Computer Center
Titusville	Computrac
GEORGIA	
Bremen	Bremen Electronics/Radio Shack
Cummings	Kent Radio Shack
Jesup	Radio Shack
Marietta	Act One Video
Toccoa	Martin Music Radio Shack
IDAHO	
Moscow	Johnson News Agency
ILLINOIS	
Aurora	Kroch's & Brentano's
Belleville	Software or Systems
Champaign	Book Market
Chicago	B. Dalton Booksellers
	N. Wabash St.
	West Jackson St.
	Bob's in Newtown
	Bob's News Emporium
	Bob's Rogers Park
	Book Market
	East Cedar
	North Cicero
	West Diversey
	E.B. Garcia & Associates
	Kroch's & Brentano's
	South Wabash
	West Jackson
	516 N. Michigan
	835 N. Michigan
	Parkway Drugs
	Parkwest Books
	Sandmeyer's Bookstore
	Univ. of Chicago Bookstore
	Univ. of Illinois Bookstore
	Videomat, Inc.
Chillicothe	Book Emporium
Danville	Book Market
Decatur	Book Emporium
	K-Mart Plaza
	Northgate Mall
East Moline	Book Emporium
Evanston	Chicago-Main News
Geneseo	B & J Supply
Kewanee	Book Emporium
Lisle	Book Nook
Newton	Bill's TV Radio Shack
Oak Brook	Kroch's & Brentano's
Oak Park	Kroch's & Brentano's
Paris	Book Emporium
Peoria	Book Emporium
	Sheridan Village
	Westlake Shopping Center
	Book Market
	Illinois News Service
Schaumberg	Kroch's & Brentano's
Skokie	Kroch's & Brentano's
Springfield	Book Emporium
	Sangamon Center North
	Town & Country Shopping Ctr.
Sunnyland	Book Emporium
West Frankfort	Paper Place
Wheeling	North Shore Distributors
INDIANA	
Berne	White Cottage Electronics
Columbus	Micro Computer Systems, Inc.
Garrett	Finn News Agency, Inc.
Greenwood	The Computer Experience
Indianapolis	Bookland, Inc.
	Delmar News
	Indiana News
Jasper	Elex Mart
Madison	Arco Office Supplies
Martinsville	Radio Shack
Wabash	Mitting's Electronics
IOWA	
Davenport	Interstate Book Store
KANSAS	
Topeka	Palmer News, Inc.
	Town Crier of Topeka, Inc.
Wichita	Amateur Radio Equipment Co.
	Lloyd's Radio
KENTUCKY	
Georgetown	Goodwin Electronics
Hazard	Daniel Boone Gulf Mart
Hopkinsville	Hobby Shop
Louisville	The Computer Store
Paducah	Radio Shack
Paintsville	R-Kat Electronics
Pikeville	Gus-Stan Enterprises
Princeton	Miller Electronics
LOUISIANA	
Crowley	Acadiana Newsstand
Monroe	The Book Rack
MAINE	
Brockton	Voyager Bookstore
Caribou	Radio Shack
Waterboro	Radio Shack
MARYLAND	
Silver Spring	Layhill Newsstand
MASSACHUSETTS	
Brockton	Voyager Bookstore
Cambridge	Out Of Town News
Fitchburg	Corners Book Shop
Ipswich	Ipswich News
Littleton	Computer Plus
Lynn	North Shore News Co.
MICHIGAN	
Allen Park	Book Nook, Inc.
Dearborn	DSL Computer Products
Durand	Robbins Electronics
Harrison	Harrison Radio Shack
Lowell	Curt's Sound & Home Arcade Center
Mt. Clemens	Key Book Shop
	Michigan Radio
Muskegon	The Eight Bit Corner
Owosso	C/C Computer Systems
Perry	Perry Computers
	Perry Oil & Gas
Roseville	New Horizons
Royal Oak	Software City
St. Johns	Clinton Electronics
Sterling Heights	Sterling Book Center
Wyoming	Gerry's Book Co.
MINNESOTA	
Minneapolis	Read-More News
Willmar	The Photo Shop
MISSOURI	
Farmington	Ray's TV & Radio Shack
Kirksville	T&R Electronics
Moberly	Audio Hut
St. Louis	Book Emporium
	Computer Xchange
University City	Final Edition
MONTANA	
Whitefish	Consumer Electronics of Whitefish
NEBRASKA	
Lincoln	Hobby Town
Omaha	Computers & Components
NEVADA	
Las Vegas	Hurley Electronics
NEW HAMPSHIRE	
West Lebanon	Verham News Corp.
NEW JERSEY	
Cedar Knolls	Village Computer & Software
Clinton	Micro World II
Lawrenceville	Micro Con Software Center
Linwood	Software City
Marmora	Outpost Radio Shack
Montvale	Software City
Pennsville	Dave's Elect. Radio Shack
River Edge	Software City
Rockaway	Software Station
NEW MEXICO	
Alamogordo	New Horizons Computer Systems
Albuquerque	Desert Moon Distributors
	Page One Newsstand
NEW YORK	
Brockport	Lift Bridge Book Shop, Inc.
Elmira Heights	Southern Tier News Co., Inc.
Fredonia	On Line: Computer Access Center
Hudson Falls	G.A. West & Co.
Johnson City	Unicorn Electronics
New York	Barnes & Noble—Sales Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pan Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop

	Jonil Smoke
	Penn Book
	Software City
	State News
	Usercom Systems, Inc.
	Walden Books
	World Wide Media Services
N. White Plains	Software City
Rochester	Village Green
	World Wide News
Woodhaven	Spectrum Projects

NORTH CAROLINA

Aberdeen	King Electronics
	Radio Shack
Cary	News Center in Cary Village
Charlotte	Newsstand Int'l
	Papers & Paperback
Havlock	Computer Plus
Hickory	C^2 Books & Comics
Marion	Boomers Rhythm Center

NORTH DAKOTA

Fargo	Computer Associates

OHIO

Blanchester	JR Computer Control
Canton	Little Professor Book Center
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoff
Columbiana	Fidelity Sound & Electronics
Coshocton	Utopia Software
Dayton	Huber Heights Book & Card
	Wilke News
Fairborn	News-Readers
Girard	Girard Book & News
Kent	The News Shop
Kenton	T.W. Hogan & Associates
Lakewood	Lakewood International News
Lima	Brunner News Agency
	Edu-Caterers
Miamisburg	Wilke News
Mount Orab	Mount Orab Radio Shack
Rocky River	Programs Unlimited
Toledo	Leo's Book & Wine Shop
Xenia	Fine Print Books

OKLAHOMA

Oklahoma City	Merit Micro Software
Tulsa	Steve's Book Store

OREGON

Portland	Fifth Ave. News

PENNSYLVANIA

Allison Park	Software City
Altoona	Newborn Enterprises
Brookville	Larry's Stereo Shop
Malvern	Personal Software
Philadelphia	City Software Center
	Newsy
Phoenixville	Stevens Radio Shack
Pittsburgh	All-Pro Souveniers
Pleasant Hills	Pitt Computer & Software
Temple	Software Corner
Wind Gap	Micro World
York	The Computer Center of York

RHODE ISLAND

Warwick	Software Connection

SOUTH CAROLINA

Charleston Hts.	Software Haus, Inc.
Gaffney	Gaffney Book Store
Greenville	Palmetto News Co.
Spartanburg	Software City
Union	Fleming's Electronics

TENNESSEE

Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Dickson	Highland Electronics
Knoxville	Anderson News Co.
	First Byte Computer Co.
Memphis	Computer Center
	Software, Inc.
Nashville	Mosko's Book Store
Smyrna	Delker Electronics
Union City	Cox Electronics Radio Shack

TEXAS

Elgin	The Homing Pigeon
Ft. Worth	Software Terminal
Orange	Northway Books & News
San Antonio	CoCo Nuts

UTAH

Murray	Deseret Book

VIRGINIA

Gafton	Electronics Marketing
Norfolk	I-O Computers
Richmond	Software City

WASHINGTON

Seattle	Adams News Co., Inc.
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes

WEST VIRGINIA

Huntington	Nick's News
Logan	Stan's Electronics & Radio Shack
Madison	Communications, LTD
Parkersburg	Valley News Service

WISCONSIN

Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Ladysmith	Electronics, Etc.
Milwaukee	Book Tree
	Booked Solid
	Booked Solid II
	Harvey Schwartz Bookshop
	Univ. of Wisconsin Bookshop

WYOMING

Casper	The Computer Store

ARGENTINA

Cordoba	Informatica Y Telecomunicaciones

AUSTRALIA:

Kingsford	Paris Radio Electronics

CANADA:
ALBERTA

Banff	Banff Radio Shack
Blairmore	L & K Sports & Music
Bonnyville	Paul Tercier
Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
	Kelly Software Distributors
Edson	Radio Shack
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound
	A.S.C. Radio Shack
Ft. Saskatoon	Ft. Mall Radio Shack
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminster	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack

BRITISH COLUMBIA

Burnaby	Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
Chilliwack	Charles Parker
Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Langley	Langley Radio Shack
N. Vancouver	Microwest Distributors
Nelson	Oliver's Books
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Salmon Arm	Matrix Computing
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
100 Mile House	Tip Top Radio & TV

MANITOBA

Altona	L.A. Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises
Winnipeg	J & J Electronics Ltd.

NEW BRUNSWICK

Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.

NEWFOUNDLAND

Botwood	Seaport Elec.
Carbonear	Slade Realties

NOVA SCOTIA

Halifax	Atlantic News

ONTARIO

Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hamilton	Dataman
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kenora	Donny "B"
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV

QUEBEC

LaSalle	Messageries de Presse Benjamin Enr.
Pont. Rouge	Boutique Bruno Laroche

SASKATCHEWAN

Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound

YUKON

Whitehorse	H & O Holdings

JAPAN

Tokyo	America Ado, Inc.

PUERTO RICO

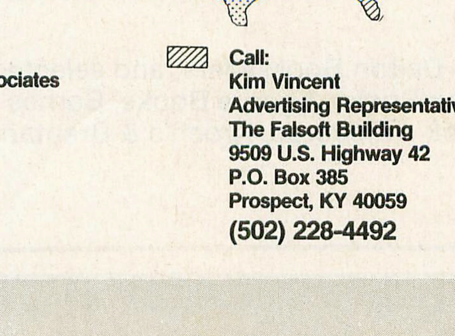
San Juan	Software City

Also available at all B. Dalton Booksellers, and selected Coles Bookstores, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

ADVERTISER'S INDEX

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning **THE RAINBOW** when you contact these firms.

After Five Software 146
Ark Royal Games 13
Canyon County Devices 144
Cer-Comp 140, 141
Challenger....................195
Cinsoft 134
CirPak.........................31
CNR Engineering..............99
CoCo Trend 139
Cognitec 133
Colorware...............22, 23, 25
CompuServe 65
Computer Center 35
Computer Friends 156
Computer Island 82
Computer Plus 3
Computerware.............39, 41
Computize, Inc...........163, 209
Dayton Associates of
W. R. Hall, Inc. 128
Delphi....................42, 43
Derringer Software.........88, 89
Diecom.......................IFC
Disto..........................IBC
Dorsett 11
Duck Productions 30
Electronic Motion Control 177
Federal Hill Software 185
Hard Drive Specialists 169
Hawkes Research Services 73
HJL div. of Touchstone
Technology, Inc.............19
Hogg, Frank Laboratories......197
Horizon 155
Howard Medical 34, 210
J & M Systems.................BC
J & R Electronics 135
Johnson, D.P..................199
Kelly Software Distributors......14
Lomig 157
Mark Data Products 175
Metric Industries...........78, 179
Micro Works, The 172
Microcom Software 16, 17
Microtech Consultants Inc.......71
MicroWorld 148
Mix, Tom Software 150, 151
Moreton Bay 93
Other Guys Software, The.......28
Owl-Ware 46, 47
PCM 124
Perry Computers 136
Plan-Net Forms 181
Polygon 142
Preble's Programs, Dr. 60
Prickly-Pear Software............75
PXE Computing 7
Radio Shack 50, 51
Rainbow Adventure Book II 6
Rainbow Binder 20
Rainbow Bookshelf...........18
Rainbow Gift Subscription 13
Rainbow On Disk 8
Rainbow On Tape 16
RAINBOWfest 114, 11
Robotic Microsystems 8
Saguaro Software 17
SECA 18
Selected Software 7
Software House, The 7
Software Support, Inc........62, 6
Spectrosystems 15
Spectrum Projects Inc.
....105, 106, 107, 109, 110, 11
Speech Systems
.............118, 119, 120, 12
Sugar Software 14
Sunrise Software 19
T & D Software 12
TCE 4
Tepco 6
Thinking Software, Inc. 2
Tothian Software Inc...........15
True Data Products 192, 19
Woodstown Electronics........165
Zebra Systems 10



░ **Call:**
Shackleford, Nolan, Davis, Gregg and Associates
Cindy Shackleford, president
Shirley Duranseau
Advertising Representative
12110 Meridian South, Suite 5
P.O. Box 73-578
Puyallup, WA 98373-0578
(206) 848-7766

▨ **Call:**
Kim Vincent
Advertising Representative
The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059
(502) 228-4492

▓ **Call:**
Jack Garland
Garland Associates, Inc.
10 Industrial Park Road
Hingham, MA 02043
(617) 749-5852

ALL SOFTWARE
COMPATIBLE
WITH
COCO I & COCO II
COMPUTERS

Computize INC

VISA (215) 946-7260 P.O. BOX 207 • LANGHORNE, PA 19047 MasterCard
Check or M.O. • Add $3.00 shipping • PA residents add 6% sales tax

★ ★ ★ ★ ★ ★ ★ THE LATEST IN COCO NEWS!!! ★ ★ ★ ★ ★ ★ ★

OUR
GRAPHICOM
DIGITIZER
JUST GOT BETTER
SEE PAGE 163

SUPER BACK-UP UTILITY©

.WITH S.B.U. FROM COMPUTIZE — OU'LL NEVER NEED ANOTHER BACK- UTILITY FOR YOUR COCO!!! UPER BACK-UP UTILITY WILL PERORM **ALL** OF THE FOLLOWING FUNCONS:

TAPE TO TAPE (Regardless of most protection schemes!)
TAPE TO DISK (Move Cassette programs to Disk!)
AUTO RELOCATE (For those Cassette programs that conflict with Disk operating systems.)
DISK TO TAPE (Place Disk programs onto Cassette)
DISK TO DISK (Our powerful Split-N-Image Program, Copies regardless of most protection schemes!)
MENU DRIVEN
REQUIRES 32K EXTENDED COCO
REQUIRES 1 OR 2 DRIVES
ALL MACHINE LANGUAGE!!!

OMPARE WITH OTHER INDIVIDUAL ROGRAMS COSTING IN EXCESS OF 00.00

ISK $49.95 .... Cat. No. 107CD

SPIT-N-IMAGE©

M/L Disk Back-Up Utility

here is no need to suffer the heartbreak of ashed disks any longer. Spit-N-Image will eate a mirror image of your valuable disk pro-ams which do not respond to normal back-up inctions. Will also initialize and back-up in one ass. Data processing experts always insist on aving a back-up — it's good practice.

REQUIRES 32K CC

ISK $34.95 .... Cat. No. 101CD

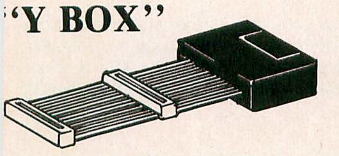
TRIPLE TRANSFER UTILITY©

ransfer contents of disk to tape • Transfer connts of tape to disk • Automatically relocates issette programs that conflict with the disk perating system • Displays machine language rogram addresses • Copies ASCII, Basic, & lachine Language Programs • All contained in menu driven program!

REQUIRES 32K CC EXT.

isk $24.95 .... Cat. No. 105CD

'Y BOX"



f you have ever owned a **"Y" Cable** you know ow easy it is to 'bump' or dislodge the cable rom the computer. With the positive mechanical onnection of the **"Y Box"** chances are greatly educed of the "Y" coming dislodged.

ne of the most common causes of a shorted lata bus in the CoCo is a misaligned or loose **'Y" Cable.** Don't let your computer be the next ictim of a **"Y" Cable.** order the **"Y Box"** from OMPUTIZE.

- NOISE FREE "**GOLD CONTACT**" TO YOUR COMPUTER
- POSITIVE **MECHANICAL** AND **ELECTRICAL** CONNECTION
- Catalog No. 162CH Only **$29.95**

MASTER KEY II

New Improved Version! A hardware product that takes control of any program regardless of protection. Now use with RS Multi-pak, "Y" cable or **optional** extender cable. Captures register contants as they were when Master Key II was engaged. Complete disassembler, memory save, and much more. Requires some familiarity with Assembly Language.

ROM PAK Cat. No. 160HR .... $ 99.95
Cat. No. 161HR With Ext. Cable $109.95

QUICK BACKUP UTILITY $19.95

NEW

Catalog No. 185CD

Deluxe backup utility for the Radio Shack Color Computer.

- Backup a disk in as few as 32 seconds (in three passes)
- Format and backup a full disk in one minute
- Full error correcting features (retry, skip, infinite retry)

Displays the current track that is being processed, works with all ROM versions. Supports 1 or 2 disk drive. A great disk production tool.

GRAPHICOM $24.95

Catalog No. 111GD
Simply stated - One of the finest graphic programs written for the Color Computer!
FEATURES:

- S-U-P-E-R U-S-E-R F-R-I-E-N-D-L-Y !
- Supports 4 Hi-Res display modes
- 4 page animation mode
- Color Palette with over 15 color patterns for use with Hi-Res artifact
- Send/Receive pictures over modem
- Supplied utility allows capturing Hi-Res screens from most COCO arcade games
- Multiple Hi-Res character fonts (user redefinable)
- Supplied utility for transferring Graphicom screens to Basic or other M/L programs.
- Supplied utility for loading screens from Basic or other sources
- Built in Hi-Res SCREEN PRINT (compatible with EPSON, C-ITOH, GEMINI-10, OKI, plus Radio Shack's LP-VII, LP-VIII, DMP-100, DMP-200, and GCP-115 printers) from 110 to 9600 baud
- SEND/RECEIVE slow-scan television
- Many additional features, operating hints, hardware mod's and suggestions, etc.

REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS

NEW
ERROR
CONTROL
COUPLING

Announcing Colorscan, new software for the CGP-220. This program is a must for anyone who owns a Radio Shack Ink Jet Printer, and enjoys creating graphics with Graphicom, Graphicom Part II, CoCo MAX, or any program that produces a standard 6K biannary picture file.

This program contains some of the popular features found in "HARDCOPY" Such as 1x1, 2x2 and posters; but color scan produse full color prinytouts of your favorite 6K graphics files. You can also create colorful banners up to 27' in length, or dump a disk's entire graphic contents to paper.

Colorscan will print program listings in blazing color, make remarks in red, line numbers green, search for strings and print in blue, etc. All these features and more.

Colorscan catalog number 184WD $29.95

GRAPHICOM PART II $24.95

GRAPHICOM PART II DOES NOT REQUIRE GRAPHICOM TO RUN!

DISK
PAINT
COPY
GRAPHICOM
PART II
©1984 WHITESMITH V:1.0

Graphicom Part II is a video processing package that provides many functions that are missing in Graphicom. Here are just a few of the features provided by Graphicom Part II:

ENLARGE/REDUCE/ROTATE
Enlarge or reduce any portion of a graphic screen, just like a photographic enlarger! Rotate by any degree or fraction of a degree around any point on the screen.

PAINT
Paint or "fill-in" any irregular area on the screen! More than 50 different colored patterns available. Additional paint patterns may be user-defined.

PAN & ZOOM
"Zoom in" x2, x4, or x8 on any portion of the screen to do fine pixel work. Allows editing of Graphicom character sets with ease!

TYPESETTER & FONT EDITOR
Add text in 16 different sizes, also supports user definable foreground & background colors. Design & Edit characters for use in the typesetter.

PIXEL BLASTER
Allows the user to easily substitute or remove colors. Widen lines, swap BLUE & RED without effecting BLACK & WHITE, etc.

Graphicom Part II requires a 64K extended disk basic system, and supports 1 to 4 disk drives, keyboard or joystick (analog or switch type) input. It will load and save both **Standard BIN** files and **Graphicom** screens. All functions support color or Hi-Res operation, as well as the 4 screen display modes.

ARE YOU LOOKING FOR A HI-RES GRAPHIC SCREEN PRINT PROGRAM?

HARDCOPY
THE ULTIMATE PRINTER UTILITY
DISK
©1984 WHITESMITH V:1.0
ALL RIGHTS RESERVED

HARDCOPY - Hardcopy is more than just a screen print utility, compare these features with any other graphic dump program on the market;

- Full GRAPHICOM/GRAPHICOM PART II compatibility! Loads STANDARD 6K images, GRAPHICOM pictures, and COCO MAX pictures too!
- BLACK & WHITE or GREY SCALE printing. In GREY SCALE printing, colors are printed as user definable patterns. Supports hi-res in all 4 GRAPHICOM display modes!
- **1x, 2x, 3x PRINTOUTS** - Three menu options are reserved for the most frequently used printout sizes; 1x (quarter page), 2x (half page), and 3x (full page).
- **GRAPHIC LABELS** - The label printing option allows the user to create custom mailing or disk labels with professional looking results.
- **GREETING CARDS** - The greeting card option allows the user to custom design greeting cards using both text and graphics.
- **GIANT POSTERS** - The poster option provides the user with a means of reproducing a hi-res graphic to a multi-sheet poster.
- **SPECIAL EFFECTS** - The special effects option allows the user to directly control the printing directives; ROTATION, X/Y SIZE, X/Y FLIP, X/Y GRID, X/Y FILL, TAB, WINDOW, POS/NEG IMAGE, and more!
- **USER CALL** - Have an application that **HARDCOPY** doesn't quite match? **HARDCOPY** routines can be added to EXTENDED BASIC through the USR command!

HARDCOPY* requires a 64K Color Computer or Color Computer II, and at least one disk drive.It supports 1 to 4 disk drives, keyboard or joystick input. Please specify **printer** and **cat. number** when ordering.
* Due to hardware differences, some features may function differently on certain printers.

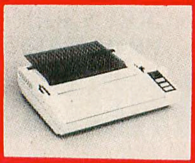
IDS 480/560-G	Cat. No. 170WD
Oki 82A (Okigraph)	Cat. No. 179WD
Okidata 92	Cat. No. 171WD
Gemini 10X	Cat. No. 174WD
Gemini SG-10/15	Cat. No. 178WD
DMP-105	Cat. No. 183WD
Epson LX-80	Cat. No. 173WD
Epson MX-80	Cat. No. 172WD
Epson RX-80	Cat. No. 173WD
Epson FX-80	Cat. No. 173WD
Riteman PLUS	Cat. No. 177WD
DMP-110	Cat. No. 180WD
DMP-120	Cat. No. 176WD
DMP-130	Cat. No. 182WD
DMP-200	Cat. No. 175WD
CGP-220	Cat. No. 181WD

HARDCOPY PRINT UTILITY $29.95

Howard Medical Computers

(800) 443-1444 ORDERS **(312) 278-1440** INQUIRIES AND ORDER STATUS

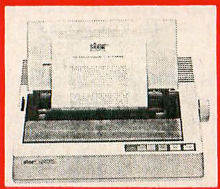
PRINTERS



NEW
Dual Mode
EPSON LX-80

The LX-80 offers draft or near letter quality plus a 1K input buffer for much faster graphics printing speed. LX-P package includes the LX-80, a Botek serial to parallel converter, and a Howard Printer Tutorial.

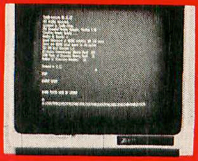
$317 **($7 shipping)** **Add $29.50 for tractor ET-1**



STAR
NX-10

The NX-10 is the latest generation of printers and offers built-in back tractor feed giving forward and backward movement of paper plus exceptional graphics printing capabilities. NX-P package includes the NX-10, a Botek serial to parallel converter and the Howard Printer Tutorial. **$307** **($7 shipping)**

MONITORS



ZENITH

123A 12"

This 12" green screen high resolution monitor offers 80 column capability, Zenith quality and a 30 day warranty valid at any of Zenith's 1200 locations.

Retail $149 **Our price** **$67.50** **($7 shipping)**

122A Zenith 12" Amber Screen offers the same 640 dots × 200 dots resolution at 15MHz as the 123A and a 90 day warranty valid at our 1200 locations. **($7 shipping)** **$88**

Closeout Specials — only 14 in stock. We have a limited number of lesser known color monitors that have been discontinued but are brand new in their original boxes. **$149** **($14 shipping)**

141 Roland 13" Color Monitor with speaker, 270 dots × 200 dots resolution, 4 MHz band width. **$217** **($14 shipping)**

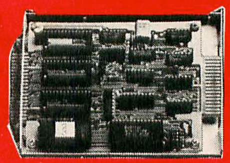
131 Zenith 13" Color Monitor has medium resolution with speaker and RGB jack. **($14 shipping)** **$168**

All monitors require an amplifier circuit to drive the monitor and are mounted inside the color computer. They attach with spring connectors, with two wires extending out of the computer, one for audio and one for video.

VA-1 for monochrome monitors only, fits all color computers **($2 shpg)** **$24.45**

VC-4 for monochrome or color, fits all color computers **($2 shpg)** **$39.45**

DISK CONTROLLERS



DISTO

DC-3

Includes controller and DOS ROM Chip.

$98 **($2 shipping)**

ADD-ON BOARDS

DC-38 includes 80 column capacity, parallel printer, real time clock, and all software **$138**

DC-256 256K RAM Board includes software to access all RAM **$125**

DC-3P Mini EPROM Programmer includes all software to program 2764 or 27128 **$55**

DC512 512K RAM Board **$165**

RS-1 Radio Shack's 1-1 ROM based operating system **$20**

DD-2 Double sided 360K disk drive with ½ height case and power supply **$188**

CA-1 Cable to connect controller to one drive **$24.50**

CA-2 Two drive cable **$29.50**

MEMORY

64-E1 for E Boards with complete instructions. Remove old chips and replace with preassembled package—no soldering or trace cuts. **($2 shpg)** **$28.45**

64-F1 for F Boards. No soldering needed. Capacitor leads must be cut. **$24.45** **($2 shipping)**

64-2 for COCO 2. Kit requires one solder point, no trace cuts. **($2 shipping)** **$24.45**

64-22 Two chip set for 26-3134A and B, 26-3136A and B, Koren Color Computers require 1 solder point **$28.45** **($2 shipping)**

SOFTWARE SPECIALS

PAYROL/BAS™

Written in nonprotected basic for the color computer. This easy-to-use package of programs will simplify and decrease the time spent doing payroll. *Rainbow* May 1986 review says, "Elegant and professional." State and federal tables are already included. Send $1 for 11 page reports guide. **$79.95**

VIP LIBRARY

Softlaw's integrated package includes VIP writer terminal, data base, call and disk zap which can fix a diskette that is giving I/O errors. **$125**

SAP-II

Stock analysis program organizes your portfolio and gives specific sell and stop-loss points. **$19.95**

BPA-1

Chart your blood pressure from daily readings taken in the comfort of your home. **$19.95**

GUARANTEE

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatability. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back, (less shipping).

Howard Medical Computers 1690 N. Elston Chicago, IL 6062

ORDERS **(800) 443-1444**

INQUIRIES AND ORDER STATUS **(312) 278-1440**

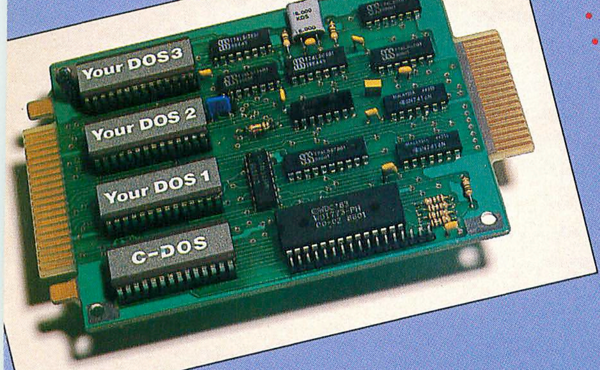
Showroom Hours:
8:00-4:00 Mon-Fri.
10:00-3:00 Sat.

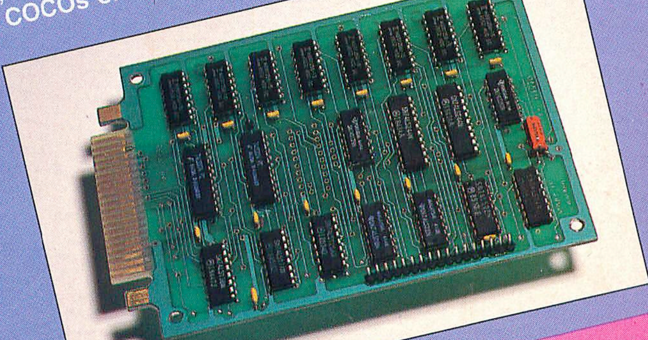
WE ACCEPT: VISA • MASTERCARD • AMERICAN EXPRESS
C.O.D. OR CHECKS • SCHOOL P.O.'S

FROM C.R.C COMPUTERS DISTO SUPER PRODUCTS

DISTO SUPER CONTROLLER $99.95

- Gold contacts on all connectors
- Shielded metal box
- Four 28 pin sockets for software expandibility
- Uses 2764 or 27128 EPROMs only
- EPROMs are software selectable
- Internal Mini-Expansion-Bus interface for DISTO SUPER add-ons or user projects
- C-DOS included (RS-DOS compatible), single or double sided, 6 to 30 ns step rate
- Works on all COCOs or COCO IIs





DISTO SUPER RAMDISK $129.95/256K $169.95/512K

- Inexpensive 2nd drive Emulator
- Works with all COCOs (Multi-Pak required)
- Easy installation, Just plug in and go
- Low software overhead
- Much faster than a regular drive
- Plain language instructions
- Complete OS-9 Drivers available*
- Compatible with COCOMAX if used with C-DOS+
- Internal Mini-Expansion-Bus for DISTO ADD-ONS
- Gold contacts on all connectors
- Shielded metal box

DISTO SUPER ADD-ONS

Your add-ons are currently available

REAL TIME CLOCK/PRINTER INTERFACE
An internal clock that will keep the proper time, date and year. A small battery keeps the time when the computer is off. Retreive and set the time by using simple Basic Pokes. The Real Time Clock/Parallel Printer Adapter is a single unit. Software drivers included. $39.95

- **MINI EPROM PROGRAMMER**
Yes, a low cost programmer that attaches to the DISTO SUPER CONTROLLER or SUPER RAMDISK. Program those often used utilities into EPROMs and plug them directly into your controller. Will program 2764's or 27128's. A perfect mate for the DISTO SUPER CONTROLLER. $54.95
- **DISPLAY 80 SUPER CARD**
A real knock-out. DISPLAY 80 is a three in one card. It's major function is to add an 80 column by 24 line display to your computer. This feature packed package also includes a REAL TIME CLOCK and PARALLEL PRINTER INTERFACE. An all-in-one package that fits neatly inside the Controller or Super Ramdisk. OS-9 software available*. $139.95
- **HARD DISK INTERFACE (Coming soon)**
Fits inside Super Controller or Super Ramdisk. S.A.S.E. interface compatible. OS-9 Drivers available*. Supports WD-1002-SHD or ZEBEC 1410 controller.

CRC COMPUTERS inc.
10802 Lajeunesse,
Montreal, Quebec
Canada, H3L 2E8
1-514-383-5293

The DISTO SUPER CONTROLLER, add-ons and documentation are received and designed by Tony Di Stefano. The DISTO SUPER CONTROLLER and add-ons are manufactured and distributed by: CRC COMPUTERS INC. DISTO and C.R.C Computers are registered trade marks. The DISTO Super Controller and add-ons are copyrighted by DISTO.

*All OS-9 drivers sold separately

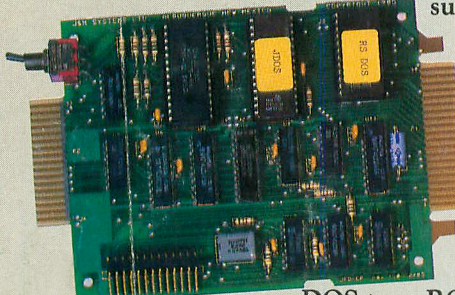
HEAT UP YOUR COCO!

New HARD DRIVES

Besides the obvious advantage of increased disk access speeds and a vast amount of storage, our COCO hard drives boast many innovative features. For instance, you may boot OS/9 directly from JDOS - no intermediate boot floppy is required. Our software can run with virtually any winchester with a ST412 type interface. Our drives have capacities of 5, 10, or 20 MBytes (formatted), and may be either partitioned into up to 7 logical units or left as one large logical unit. Our COCO hard drive systems are complete with case, power supply, cables, OS/9 drivers, and instructions. Prerequisite: OS/9, JFD-CP controller.

5¼" 5 MByte full size	$495
5¼" 10 MByte ½ size	$650
3½" 20 MByte (shown above)	$795

JFD-CP DISK CONTROLLER



Our new JFD-CP, compatible with both the original COCO and the COCO 2, features a parallel port to support a Centronics compatible printer or our hard drive, and an external ROM switch, which allows you to select JDOS or an optional RS DOS-type ROM. It comes in a case and includes JDOS 1.2 and manual. JDOS implements all RS DOS commands, plus many more, including auto line numbering, error trapping, baud rate selection, OS/9* boot from floppy or hard drive, and Memory Minder**, our disk drive analysis program (Precision Alignment Disk not included).

JFD-CP Disk Controller with JDOS	$139

COCO-CLASSIC

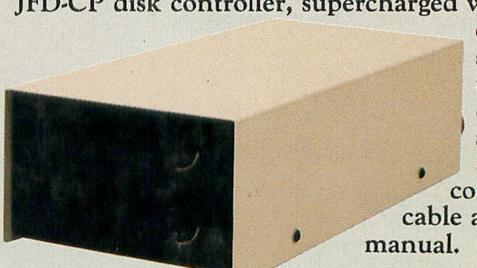
Our old JFD-COCO controller remains a strong seller. Some people just like old "classics" best! So we have brought it back at the lowest price ever!

JFD-COCO Disk Controller with JDOS	$99

New TERMS

One-year warranty on parts & labor; 30-day money back guarantee (except shipping) if not totally satisfied. Items must be returned in like new condition.
Free shipping via UPS in continental United States for payment by VISA, MasterCard, or cashiers check. COD requires 10% prepayment by bank card plus 3% shipping. Blue Label and foreign shipping extra.

DRIVE SYSTEMS



Upgrade your Color Computer by adding our new JFD-CP disk controller, supercharged with JDOS 1.2 operating system, and a top quality drive with case and power supply. Comes complete with cable and JDOS manual.

Drive 0 System with one single side drive	$279
Drive 0 System with one double side drive	$349
Drive 0,1 System with two single side drives	$389
Drive 0,1 System with two double side drives	$489

MEMORY MINDER**

Memory Minder is a disk drive test program now included in JDOS. Used with a Precision Alignment Disk, Memory Minder allows you to check your drives for speed, alignment, sensitivity, hysteresis, and more! You can actually align or adjust the drives while viewing the graphics on the screen. No special equipment needed!

PRECISION ALIGNMENT DISKS (From Dysan)

PAD-40X1: Tests single side disk drives	$26
PAD-40X2: Tests double/single disk drives	$33

Memory Minder is available on diskette for those who don't own a JFD-CP controller with JDOS. Includes Precision Alignment disk.

Memory Minder: single side package	$59
Memory Minder: single/double side package	$75

*OS/9 is a registered trademark of Microware, Inc.
**Memory Minder is a registered trademard of J&M Systems, Ltd.

J&M SYSTEMS, LTD.

15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182